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WORKER ADJUSTMENT IN THE WOOD PRODUCTS INDUSTRY IN A CHANGING ERA

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THE ECONOMIC IMPACT OF FEDERAL LOG SUPPLY CONSTRAINTS IN NORTHEAST OREGON

David W. Holland, David B. Willis, and Edward C. Waters

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ABSTRACT

Traditional, fixed-price (input-output) economic models provide a useful framework for conceptualizing linkages in a regional economy. However, apparent shortcomings with input-output (IO) methods can severely restrict the analyst's ability to deduce valid prescriptions for public policy and economic development. A superior approach using regional computable general equilibrium (CGE) models is presented. A brief survey of relevant literature is included. CGE results under several different resource policy scenarios are examined for a regional economy in Northeast Oregon. In a severe CGE scenario, elimination of 80 percent of federal log supplies resulted in the loss of 2,532 jobs (4.2 percent of regional employment), and $60 million (3.3 percent) of household income. Results of the same shock with an input-output model of the region indicated a loss of 3,453 jobs and $83 million in household income. The IO estimate of job loss was 36 percent higher than the CGE estimate, while the IO household income loss was 38 percent higher than the CGE estimate. For less severe scenarios (like a 50 percent reduction in federal log supply) the IO estimates of income and employment loss were larger than the CGE estimates by between 60 and 70 percent. Study results indicate an upward bias in estimated loss of regional income and jobs using IO methods.

Keywords: Regional economics, computable general equilibrium models, input-output models, economic base theory, public resource policy.

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INTRODUCTION

Background

During the 1980s, annual timber harvest from public lands in Oregon consistently approached historically high levels. In 1990, timber harvests in Western Oregon began a dramatic decline largely reflecting increasing land use restrictions due to the listing of the northern spotted owl as an endangered species. East of the Cascades, however, the decline has been less precipitous. While total cut on westside National Forests (USFS) decreased by 81 percent from 2,238 MMBF (Scribner rule) in 1988 to 416 MMBF in 1993; over the same period, eastside forest harvest declined by 45 percent from 1,250 MMBF to 685 MMBF (Table 1). This trend is also evident on Bureau of Land Management (BLM) lands, although on the eastside, BLM harvests are of relatively minor importance (Oregon Department of Forestry).

Examination of Table 1 reveals an opposite, positive response for private timber. Private harvest increased by 93 MMBF (3 percent) on the westside and by 257 MMBF (51 percent) on the eastside. The net result being that the total harvest from these three sources decreased by 44 percent on the westside, but by only 18 percent on the eastside between 1988 and 1993.[1]

Historically, natural resource industries have provided a significant portion of Oregon's employment and income. In 1992, livestock and timber-related industries together directly provided an estimated 105,000 jobs (not including several thousand resource management jobs in federal, state, and local governments). This represents about 6.5 percent of total jobs and 7.7 percent of employee compensation paid in the state (Table 2).

In the five northeast Oregon counties which provide the focus for this study (i.e., Baker, Grant, Umatilla, Union, and Wallowa Counties), employment in livestock and timber-related sectors is significantly more important. Of approximately 60,000 regional jobs in 1992, livestock directly provided 5,300 jobs. Logging, lumber, and wood products provided another 4,100 jobs. Together these industries contributed about 15 percent of regional employment and employee compensation (Table 2).

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[1]Some care should be taken when comparing historical harvests. As cuts include more private and younger aged trees, the ratio of total processed output to log input will change, creating a measurement problem. The log scale measurement was established for large trees and for times when logs were less than fully utilized. As a result, private timber harvest may contain 20-30 percent more effective input than the log scale is measuring.

Recent concern over the viability of several native anadromous fish runs has jeopardized traditional public land uses. Ecological disturbance causing by logging and riparian cattle grazing has been shown to adversely affect salmon spawning beds. In July 1994, The Ninth Circuit U.S. Court of Appeals issued an injunction which would effectively stop grazing activities (and eventually, perhaps, logging and road building) in the Umatilla and Wallowa-Whitman National Forests. In order to help maintain viable spawning habitat for threatened or endangered salmon, considerable change in eastside public land management policy may be necessary. As a result, the degree of future access to much of the remaining eastside public forest land for timber harvest and cattle grazing is uncertain.

Purpose

The main purpose of this study was to estimate the regional economic impact of alternative Forest Service policies regarding access to public resources in Northeast Oregon. As a prelude to this analysis, we provide a historical overview of the economy of Northeast Oregon over the past quarter of a century.

In the regional economic impact analysis, estimates of total change in regional employment and income are provided under varying assumptions about the nature and magnitude of the policy shift and length of time over which adjustment to the new policy occurs. Analysis is limited to examining the impact of hypothetical resource supply constraints on timber harvest from federal lands.

Instead of a traditional analysis using a conventional demand-driven fixed-price model,[2] this study presents results obtained using flexible-price, computable general equilibrium (CGE) model of the regional economy. CGE models provide several advantages over more conventional regional models. The structure of a CGE model is more consistent with neoclassical economic theory and flexible enough to incorporate factor and commodity substitution into the structure of production and demand.

A PROFILE OF THE NORTHEAST OREGON REGIONAL ECONOMY

The following discussion is based largely on data obtained from the Regional Economic Information System (REIS) of the Bureau of Economic Analysis (BEA). The data describe the regional economy of Baker, Grant, Union, Umatilla, and Wallowa Counties in Northeast Oregon over the period from 1969 to 1992 (U.S. Dept. of Comm., 1994). The region contains nonmetropolitan counties and is economically related to larger urban centers in Lewiston, Idaho and Walla Walla, Washington.

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[2]For example, input-output (IO), economic base (EB), and social accounting matrix (SAM) models. These types of models produce constant, marginal multipliers (i.e., invariant of the size of the economic shock) by assuming that factor (labor and capital) supply constraints are nonbinding; and that factor demand ratios, commodity supply proportions, and all prices are fixed. Multipliers derived from fixed-price models can generally be described as providing an upper bound on the amount of economic impact resulting from an exogenous demand shock.

Over 116 thousand persons were resident in the five-county, Northeast Oregon region. From 1969 to 1992, regional population grew from roughly 92,200 to 116,100 persons (Table 3). The number of full- and part-time jobs expanded from roughly 41,100 in 1969 to 59,800 in 1992.

According to our estimates for 1992, full- and part-time employment in agriculture and agricultural processing was 13,373 jobs (Table 2). The corresponding employment figure for the logging and wood products industry was 4,101 jobs. Agriculture and agricultural processing contribute 22.4 percent of total jobs while lumber and wood products constitute 6.9 percent of total jobs. Combining the two industries, we find that 29.3 percent of total jobs in the region are in traditional natural resource-based industries. By any measure, resource-based industry is economically important to the region, and in the cases of cattle production and logging and wood products industries, much of the resource base is held in the form of public lands. Behind these aggregate figures, however, stands a dramatic transformation of the regional economy.

We are especially interested in establishing the current economic baseline for this economy as well as reviewing structural changes that have characterized this economy over the last two decades. As we move into the future, it behooves us to understand the past and the implication of that past for future patterns of economic development.

Sources of Personal Income

Personal income as defined by the BEA comes from five different sources: employee compensation, (mainly wages and salaries); interest, dividends, and rent (income derived form property ownership); transfers (mainly social security payments and Medicare payments); proprietors' income (income to self-owned businesses and farms); and finally adjustments to account for people who receive income in the area, but do not live in the area (e.g., commuters). The relative contribution of each of these components to personal income is summarized in Table 4.

The major components of earned income are employee compensation and proprietors' income. In 1969, employee compensation made up 56.5 percent of total personal income. By 1992, the share had declined to 49.6 percent. In 1969, proprietors' income contributed 21.2 percent of total personal income, 44 percent from farms and 56 percent from non-farm sources. By 1992, the contribution of proprietors' income to personal income had declined to 12.3 percent, of which 23 percent was from farm and 77 percent from non-farm sources.

Two major trends emerge from examination of regional earnings data: (1) growth in wage, salary, and proprietors' income hasn't kept pace with growth in transfer and property income;[3] and (2) farm income has declined from roughly one-half of proprietors' income in 1969 t roughly one-fourth of proprietors' income in 1992.

Probably the most striking feature of the structural change in personal income in the region is the tremendous growth in transfer income (Table 4). Transfers grew from 10.7 percent of personal income in 1969 to 21.7 percent of personal income in 1992. Transfers were the fastest growing

[3]This is true for most rural Oregon counties.

component of personal income increasing 12 fold over the period. On a per-capita basis, transfers increased from $365 in 1969 to $3,548 in 1992, or nearly 10 fold.

The components of transfer income are displayed in Table 5. In 1992, most of the transfers were in the form of Retirement and Disability Insurance Benefits and Medical Payments. These two components make up nearly 78 percent of total transfer income to the region. Income Maintenance Benefit Payments (the welfare part of transfers) were $32.7 million which was 7.9 percent of total transfers. The other major component of transfer income is Unemployment Insurance Benefits which constituted 6.8 percent of the total.

The point to note here is that transfers have become the second most important source of income in the region (after employee compensation), and thus, should be viewed as a vital part of the region's new economic base. The main components of transfer income are those received by retired persons. As retired persons settle in the region, they bring with them a bundle of transfer and other property income. Such people are attracted by the lifestyle and amenities which Northeast Oregon has to offer. Transfer income has become an important part of the economic base of the regional economy.

While not as dramatic as the trend in transfer income, the picture regarding income from dividends, interest, and rent is also significant. The portion of personal income from these sources increased from 12.0 percent in 1969 to 14.7 percent in 1992 (Table 4). On a per-capita basis, the portion accounted for by dividends, interest, and rental income grew from $409 in 1969 to $2,399 in 1992.

We are not able to distinguish property income originating regionally from that originating outside the region. However, we suspect that the portion coming from outside has increased with the increasing attraction of the region as a vacation and retirement destination. Thus, property-type income must also be viewed as a part of the new economic base. Like transfer income, it will be an important determinant of the direction of economic change in the future. In 1992, transfer income and property-type income combined to make up 36 percent of total personal income in Northeast Oregon.

Sources of Employment

Several features of the change in the structure of regional employment are worth reviewing. Employment growth by all levels of government did not keep pace with private sector employment growth. In 1969, government employment made up 24 percent of total non-farm employment. By 1992, the share declined to 22 percent (Table 6).

The major structural change in private sector employment was the growth in service sector employment to the exclusion of nearly all other sectors. In 1969, service employment made up 23 percent of private non-farm employment in the region. In 1992, service employment made up 30 percent of private non-farm employment. The number of service jobs more than doubled from 5,996 jobs in 1969 to 12,335 jobs in 1992 (Table 6).

In relative terms, manufacturing was the largest percentage loser. Although manufacturing jobs increased from 6,292 in 1969 to 8,506 in 1992, these jobs declined as a percent of total jobs in the region. In 1969, manufacturing accounted for 24 percent of total private sector jobs. In 1992, manufacturing's share had declined to 20 percent.

Our final observation regarding regional employment trends concerns proprietors (i.e., self-owned businesses and farms), where another major change is evident. From 1969 to 1992, the number of non-farm proprietors grew from 5,937 to 10,774. Farm proprietors have been relatively constant while the number of non-farm proprietors has nearly doubled. The result is that proprietors' employment and income is now dominated by non-farm business. This was not the case two decades ago.

Summary of Regional Trends

Firms will remain under pressure to control labor costs in order to remain competitive. This will involve recent labor market trends such as capital-labor substitution, corporate down-sizing, and more competition for good jobs. Much of future job growth is likely to go to proprietors (self-owned business) rather than wage labor jobs. For example, from 1989 to 1992, the number of wage and salary jobs grew by 1,530 jobs. Over the same period, the number of proprietors grew by 1,189, almost exclusively in non-farm businesses (Table 7). Is also seems likely that the growth of relatively high paying wage labor jobs will be limited especially in sectors producing highly competitive tradeable goods.

The reduction in communication cost brought about by computers and satellites favors relatively remote regions like Northeast Oregon. Some businesses, professionals, and proprietors that were formerly unable to locate in the region may now find it profitable to do so. Examples include firms providing producer services, a component of the services sector in Table 6. The service sector is usually thought of as a non-basic sector with sales mainly to the local population. While this is true of many service businesses, it is also true that selected service firms do export most of their services outside the region. Examples are tourist-oriented and producer service businesses. The communication revolution has opened the location decision for export-oriented services. Many of these businesses are choosing to locate in high amenity regions. It is likely that such firms will become an even more important part of the Northeast Oregon economy in the future.

High amenity value is also attractive to those seeking recreation and retirement destinations. The region's wealth of natural amenities is becoming increasingly well known and appreciated. As more people take advantage of these attractions, we expect to continue to see an increase in the proportion of transfer and property income in the region.[4]

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[4]Of course, the future growth of transfer income will also depend on the outcome of the current political debate in Congress.

On the Issue of Regional Economic Base

Although we have previously referred to the term "economic base," it is well to broaden our discussion of this key concept. Economic base (or export base) theory conceptually bifurcates a regional economy into "basic" and "non-basic" activities, postulating a causal relationship between the two. A basic activity is one which creates an inflow of money in return for goods and services sold to buyers outside the region (i.e., "exported"). Regional economic activities which are traditionally counted as basic include the extractive industries (agriculture, mining, forestry, and fishing) and all primary and secondary manufacturing.

Export dollars received by basic activities are used to purchase productive inputs of goods and services, including labor. The degree to which these goods and services are supplied by regional producers and households determines the amount of non-basic activity in the region. It is assumed that non-basic activity is induced, and therefore, could not exist without basic activity. Traditional non-basic sectors include most services, retail trade, and state and local government functions.

Multipliers are calculated as the ratio of total (i.e., basic plus non-basic) activity to basic activity. In practice, estimates of industry employment and/or payroll are generally used as indicators of regional economic activity. Thus, an economic base employment multiplier can be interpreted as calculating the total number of jobs generated by an increase in export sales sufficient to require the addition of one job in a regional basic industry.

Although useful in understanding how regional economies work, the concept of economic base has been subject to some criticism and much discussion over the years. Critics points out that the static nature of the hypothesized relationship between basic and non-basic sectors fails to accommodate structural changes which characterize a developing economy. Also, the linear relationship between basic and total activity is assumed invariant with respect to the magnitude and direction of the change. Thus, an employment multiplier of 2.0 would be used to predict an increase of 20 total jobs in response to the addition of 10 basic jobs, and a loss of 2,000 total jobs in response to the elimination of 1,000 basic industry jobs.

A more fundamental criticism concerns the definition of basic activity. At the national level, balance of trade statistics are kept. These include accounts of international flows of goods, services, and finances. However, thee is no authoritative accounting of transboundary (i.e., exports and imports) flows from sub-national regions. Consequently, it is necessary to estimate the contribution of various industries' activities to a region's economic base. This is generally done either by the simple assignment method, in which all manufacturing and resource-based activity is simply defined as basic, or the location quotient method in which basic industries are those providing a greater proportion of regional employment than is true of that industry at the national level. Both of these methods can create serious errors in the estimates of the export base, especially if the structure of regional production and consumption is very different than the national average. Also, neither method accounts for the growing prevalence of self-employed activity, the emergence of non-manufacturing exports (e.g., producer services), or the increasing importance of transfer and property-type income.

Lately, the question of what activities constitute Oregon's economic base has received much attention. Until recently, the answer seemed fairly obvious: lumber and wood products' industries claimed a major share of most counties' employment, income, and export sales. Linkages with forestry, logging, transportation, and secondary wood products industries, as well as substantial industry payrolls, ensured that growth in wood products had significant multiplier impacts on regional economies. The almost pervasive nature of wood products' employment is also key. Mills have traditionally located near major timber sources, often providing the main employment in small towns and rural areas.

In a recent paper, Beuter (1995) reported that in 1990, wood products industries provided more than one-third of Oregon's economic base, with forestry, fisheries, agriculture, and food processing contributing another one-third. According to Beuter, in Eastern Oregon the contribution of wood products was less, about one-quarter, with forestry, agriculture, and food processing contributing more than 50 percent of the region's economic base. Hi-tech manufacturing, much touted as the foundation of Oregon's economic future, comprised about 11 percent of the economic base of the Portland metropolitan region, but less than 1 percent of the economic base state-wide. Beuter's analysis stresses the importance to the state economy of maintaining a viable wood products industry. He also doubts whether hi-tech manufacturing will ever become significant outside the Interstate 5 corridor due to its locational requirements which are very different from those of the timber industry.

Beuter used 1990 location quotients to estimate export base indices and defined basic activities in a fairly narrow way which tends to exaggerate the importance of resource-based industries. His analysis thus overestimates the current importance of wood products relative to other components of the regional economy. As evidence, consider that since 1990, Oregon wood products employment lost more than 10,000 jobs while total employment in the state increased by more than 50,000 jobs. Also, between 1990 and 1994, Oregon's exports to foreign countries increased 40 percent. This was largely due to dramatic increases in high technology and agriculture sales while foreign exports of lumber and wood products remained about constant.

Although these aggregate numbers ignore the important geographical aspects of the employment shift, they do indicate a trend which is not predicted by a simple economic base approach. A major problem with standard economic base analysis is that it excludes "non-traditional" components of regional economic base. For example, in 1992, combined transfer and property-type income contributed 36 percent of total personal income in Northeast Oregon. Most of this is derived from sources outside the region. Federal government spending is another important source of outside income often overlooked by standard economic base analysis. Dollars from these outside sources directly finance a large portion of industry purchases, household consumption, and local government activity, and thus, should properly be included in the regional economic base.

Economic base models provide a useful framework for conceptualizing economic linkages in a regional economy. However, apparent shortcomings can severely restrict the ability to formulate relevant prescriptions for public policy and economic development. One alternative is to use IO or SAM-based models. These fixed-price models provide internally consistent representations of regional economic structure but under very restrictive assumptions (e.g., fixed-proportion production functions, unconstrained factor and commodity supplies, and fixed or price-inelastic

demand for goods and services). Ideally suited to estimating the impact of changes in final demand, fixed-price models are severely limited in their applicability to supply-side issues. A superior approach, using regional CGE models is described below.

NATURAL RESOURCE CONSTRAINTS AND REGIONAL ECONOMIC ANALYSIS

For examples of innovative uses of fixed-price models to analyze the impacts of natural resource constraints, the reader is referred to Petkovich and Ching (1978) (mining), and Waters, Holland, and Weber (1994) (timber). Examples of CGE applications to resource policy issues can be found in Despotakis and Fisher (1988) (petroleum) and Berck, Robinson, and Goldman (1991) (water).

In the Pacific Northwest, several recent studies have used fixed-price (constant multiplier) methodologies to estimate impacts resulting from implementation of hypothetical salmon recovery plans. To our knowledge, there has been no comparable flexible-price analysis of this issue.

Aillery et al., (1994) examine direct and total impacts resulting from flow modifications on the Snake River to facilitate downstream migration of salmon. They estimate that reduced irrigation capacity could reduce agricultural employment in the Upper Snake basin by 2,500 jobs and total employment in the region by 4,100 jobs.

Haynes, Bolon, and Hormaechea (1992) compare the costs associated with implementing salmon recovery measures on National Forest land in the Columbia and Snake River basins with impacts of eliminating timber, range, and recreation programs in sensitive anadromous habitat areas. The authors conclude that even under their worst case scenario, any resulting job losses would appear fairly minor spread over the entire region, but would be quite significant in certain localities. Job loss resulting from reduced timber availability in the Umatilla and Wallowa-Whitman National Forests is estimated at between 94 and 925 jobs, depending on availability of private log supplies.

In a later study, employing similar methodology, Bolon, Hansen-Murray, and Haynes (1994) compare incremental costs of adopting the proposed interim PACFISH[5] strategy on affected anadromous fish habitat with estimates of foregone sales if timber, range, and recreation programs on Western public lands were eliminated. Their baseline scenario includes any de facto restrictions on logging, grazing, and recreation activities resulting from recent legal and administrative action. Consequently, the additional costs of implementing PACFISH appear minor compared against the value of timber and recreation programs on federal lands. However, it appears that the costs incurred in implementing the guidelines on public range may exceed the value of the federal grazing program, particularly on BLM land. No estimate of regional employment or income impacts was provided.

A detailed study by Robison and Frietag (1994) presents estimates of job and earnings impacts resulting from timber supply reductions in the three Oregon counties associated with the Wallowa-Whitman National Forest. The authors used nine community-level, economic-base

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[5]Comprehensive strategy for improved Pacific salmon and steelhead habitat management developed by the U.S. Forest Service in 1992-93. PACFISH specifies riparian management objectives to assure maintenance or restoration of fish habitat.

models to derive employment and earnings response assuming a 56 percent (-167 MMBF) reduction in available log supplies and a particular geographical distribution of mill cutbacks and closures. In aggregate, they estimate that the three-county region would lose 1,943 jobs accounting for $56 million in earnings. The authors estimate it would take a 14-fold increase in recreation activity to replace these lost jobs, or a 28-fold increase to replace lost earnings.[6]

At the local level, Robison and Frietag emphasize the uneven distribution of economic impacts in the region. They estimate that Union County would lose 15 percent of earnings and 13 percent of jobs with the community of North Powder losing 70 percent of its employment. Wallowa County would lose 11 percent of earnings and 13 percent of jobs with the communities of Wallowa and Joseph each losing more than 40 percent of their job base.

Obermiller (1994) examined impacts of the range restrictions using an updated, survey-based, input-output type model of the Wallowa County economy (Obermiller and West, 1983). He assumes that the direct effect of closing the Wallowa-Whitman National Forest to livestock grazing would reduce the cattle herd by 38 percent. Total impacts resulting from the closure include a $2.5 million (42 percent of 1981 baseline) reduction in cattle sales, $6.3 million (2.8 percent of 1981 baseline) reduction in total regional sales, and $1.25 million (2 percent of 1981 baseline) reduction in local household income.

The Pacific Rivers Council[7] commissioned Niemi, MacMullan, and Whitelaw (1994) to estimate economic impacts of legal restrictions on public grazing. They juxtapose the relatively small localized impacts of the grazing restrictions against the backdrop of a diverse, 13-county economy spread across parts of three states (Oregon, Washington, and Idaho). The authors offer severe criticism of Obermiller's results, but do not provide quantitative counter estimates. They predict that "for the region as a whole, the positive impacts of the injunction should outweigh the negative ones, especially in the long-run".

Niemi, MacMullan, and Whitelaw emphasize the inherent dynamism of this regional economy, stating that economic growth is being driven by population growth, which is strongly linked to quality of life and natural environmental amenities. Traditional resource-based industries, which tend to consume or alter these natural amenities, are shrinking and have become relatively unimportant as a source of regional growth. These themes are echoed in papers by Powers (1995) and by Rasker (1995).

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[6]However, the basis for this calculation seems curious given their description of the regional export base in which tourism was estimated to generate 4 percent of earnings in the three-county region.

[7]The Pacific Rivers Council is the lead plaintiff in the lawsuit that brought the Ninth Circuit U.S. Court injunction restricting grazing in the Umatilla and Wallowa-Whitman National Forests.

THE NORTHEAST OREGON CGE MODEL

A regional CGE model consists of a system of equations representing the equilibrium behavior of factor and commodity markets and other relevant economic institutions. The system can simulate economic response to changes in a wide array of policy, management, and behavioral variables. A key feature is the inclusion of relative prices which reflect the economic scarcity of all commodities and productive factors in the model. Endogenous prices adjust until factor and commodity market equilibrium conditions are satisfied. Compared with fixed-price models, CGE methodology is more consistent with modern economic theory, allows greater flexibility in the specification of economic behavioral relationships, and generally produces more moderate estimates of economic impact.

Implementation of a regional CGE model does not require the a priori designation of an economic base. Basic activity is not necessarily limited to a few traditional manufacturing sectors. In a CGE model, economic change is governed by "supply-side" (e.g. available quantities of productive goods and services) and trade-related constraints, rather than by backward linkages transmitted via changes in final demand. Also, since the opportunity to substitute among resource inputs is subject to diminishing returns in a CGE model, measures such as employment multipliers are variable depending on the level of resource inputs.

Figure 1 traces the basic steps of a regional CGE modeling effort. First, data are collected, organized, and reconciled into a benchmark equilibrium data set (the social accounting matrix).[8] Next, behavioral and accounting relationships are specified, and the model parameters are calibrated given the benchmark data. Finally, the policy change scenarios are introduced, and counterfactual equilibria representing the situation under the new policy regimes is calculated. Impacts are estimated by comparing the counterfactual equilibria against the benchmark scenario.

Structure of the Northeast Oregon CGE Model

Allocation of all resources and commodities in the Northeast Oregon CGE model is a function of economic scarcity as reflected by the relative prices of all goods, services, and productive factors. Thus, price variables assume a preeminent role in the model. Key determinants of relative prices include: 1) factor supply and production constraints; 2) ability of regional consumers to substitute between alternative sources of commodity supply (i.e., regional industrial supply, regional non-industrial supply and imported supply); 3) ability of regional producers to supply alternative markets (i.e., regional versus outside the region, or "export"); and 4) demand conditions affecting regional and export markets.

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[8]The data set for the Northeast Oregon CGE was assembled mainly from IMPLAN-generated regional product accounts (Alward, 1989), state of Oregon tax and expenditure data, and REIS county income and employment estimates (Waters, 1994). Timber harvest estimates (Oregon Department of Forestry) and livestock grazing statistics (Bedell; Bedell and Stringham, 1984; Hewlett, Cross, and Hart, 1987) were also used to estimate benchmark resources flow levels.

Figures 2 traces the linkages between components of the regional CGE model.[9] At the bottom of the figure, value is added to inputs of labor, proprietors' services, and capital via linearly homogeneous Cobb-Douglas production functions, and combined with intermediate inputs to produce output for each sector (X). Behavioral assumptions ensure that producers maximize economic returns by equating the marginal factor cost with the value of each factor's contribution to marginal product.

Each unit of X is either sold to local buyers (XXD) or exported outside the region (E). A constant elasticity transformation function (CET) governs the ease with which regional producers can switch between regional and export market destinations. Revenue maximization behavior by producers determines the proportion of output supplied to satisfy regional demand versus export markets. Export demand is assumed to be perfectly elastic (i.e., world commodity prices are fixed), while regional demand is influenced by endogenous price and income effects.

Commodities produced for regional use (XXD) are combined with available non-industrial supplies (GS, "government sales") to form total aggregate supply from regional sources (XD). The aggregation occurs via a constant elasticity substitution (CES) function. The treatment of government supplies as imperfect substitutes for private supplies in generating total regional commodity supply illustrates the flexibility of the regional CGE framework. In constructing this paper's analysis, we imposed quantity restrictions on federal government supplies of logs. Regional supply (XD) is, in turn, combined with competitive imports (M) via a CES aggregation to form a composite absorption good (or service) for each class of commodity (Q). The role of the nested CES functions is to allow partial substitution of private (and imported) sources of logs for federal log supplies.[10] Expenditure minimization at both stages of aggregation determines substitution between XXD and GS, and between XD and M, respectively. The use of CET and CES functions in the model accommodates the observed phenomenon of "crosshauling" in which simultaneous imports and exports appear in highly aggregated commodity classifications.

To give these variables more content, consider the following figures for the private logging sector in the baseline (1992) economy in which all estimates are in millions of dollars. Regional output of the logging sector was $158.15 (X). Of this, $139.05 (E) was exported outside the region and $19.10 (XXD) was used in the region. Logs produced and used regionally $19.10 (XXD) were combined with logs from government sales of $93.51 (GS) to form total log supply from regional sources of $112.61 (XD). Government sales were made up $20.67 (SS) from state sources and $72.84 (FS) from federal sources. Regional log supply of $112.61 (XD) was combined with log imports $16.62 (M) to form the composite log supply to the region (Q) of $129.23.

In response to a reduction of logs from federal government land (FS), the partial substitution structure of the CGE model will increase the log supply from private regional sources (XXD) and from non-regional sources (M) to partially offset the reduction in federal supply. This response will be driven by an increase in the price of logs produced and consumed in the region (XXD) that

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[9]A list of variables, parameters, and equations, and detailed descriptions of the regional CGE model is available on request.

[10]This treatment contrasts with a fixed-price analytical approach where the relative proportions of inputs from public, private, and imported sources is assumed to be fixed.

is a function of the regional excess demand for logs stemming largely from the Wood Products sector. As the regional price of logs increases, cost minimization implies that imported logs (M) will be substituted for regionally produced and consumed logs (XD).

Total supply of Q supports intermediate demand (ND) and final demand for consumer goods (C), investment needs (IT), and government purchases (G). In this model, all spending by local agencies of federal, state, and local government is fixed at baseline levels. Any reduction in revenues from taxation or government sales are assumed to be offset by transfers form other sources (i.e., state and federal government).[11] Consumption by each of three household income classes is driven by changes in endogenous factor incomes and relative commodity prices. Finally, business investment spending is fixed at baseline levels.

Model Description

The length of run for the analysis varies from relatively short-run to intermediate run. Labor is assumed to adjust across sectors according to changes in factor demand, and in the intermediate-run is assumed to be perfectly mobile in and out of the region. Corporate capital and proprietors' capital are assumed to be fixed by sector and are fixed in total for the region. Investment does not feed into the capital stock, and no technical change is assumed.

General equilibrium adjustments to federal log shocks are estimated using the above assumptions about the labor adjustment process. In the short-run, unemployed labor is assumed to remain in the region and draw unemployment compensation. In the intermediate-run, unemployment compensation is assumed to be exhausted and unemployed labor is assumed to leave the region. In a variant of the intermediate-run results, the national price of logs and wood products is assumed to change in response changes in Forest Service timber policy across the West.

Table 8 summarizes the main differences in assumptions between the three models. In the **short-run** version, labor's wage, the level of investment and the quantity of capital are fixed. Total regional employment, returns to capital, and the level of net financial inflows adjust to maintain equilibrium (Table 8). Unemployed labor remains in the region and draws unemployment compensation in the form of a government income transfer from outside the region. In the **intermediate-run** version, the outside transfer of unemployment compensation is lost and the unemployed labor is assumed to leave the region (Table 8) in search of other employment. In the **national price effect** version, both log and wood product prices are assumed to increase at the national level as the result of reductions in Federal log supply across the West. Unemployment compensation transfers are assumed to be zero. All three CGE models feature endogenously determined output, consumption imports, exports, and regional commodity prices.

In all three CGE formulations, sectoral (i.e., "corporate and proprietors") capital is assumed to remain fixed at baseline levels. The supply of capital by sector is a vertical straight line. The demand for capital varies as does the return to capital by sector. In the CGE models, the resource

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[11]While it can be argued that this assumption may tend to underestimate the extent of regional economic adjustment, it is not unreasonable given the currently changing relationship between state and local fiscal responsibilities.

shocks are implemented as proportional reductions in the baseline availability of "federal government sales" of logs. Thus, the direct impacts of resource supply shocks are treated as supply-side phenomena. This treatment has logical appeal and is also consistent with neoclassical economic theory.

A key feature of the implemented CGE modeling framework is the ability to substitute among public, private, and imported sources of logs via CES aggregation functions as described in the previous section. The ease of substitution is determined by exogenously specified elasticities and endogenous variation in the relative cost of inputs obtainable from the three alternative sources of supply. An implication of the constant elasticity specification used here is that, due to the law of diminishing returns, relatively small shifts in the availability of alternative supplies are much more easily accommodated than are major shifts. In practice, we have assumed that the substitution of private or imported logs to replace reduced public supplies is fairly difficult due to high transportation costs, and the length of time necessary to alter timber growth and harvest rotations.[12]

Estimates of relative adjustments in output, income, government revenues, and other variables are presented. Effects on income distribution are highlighted under the different modeling assumptions. In contrast to the CGE models, it may be noted that fixed-price models regard all factor supplies as interregionally and intersectorally elastic by holding all commodity and factor prices fixed. Constant multipliers result from the assumption of fixed proportion, column-normalized expenditure coefficients.[13] The magnitude of these multipliers reflect the strength of backward linkages in the regional economy. The fixed-price specification embodies traditional demand driven assumptions and procedures regarding regional economic systems. Consequently, fixed price models resource supply shocks model as "equivalent" reductions in exogenous demand for the output of the directly impacted industrial sectors.

RESULTS

Results obtained under each level of reduction of federal log supply are presented below. For each shock, CGE model results under the three model alternatives are summarized in sets of four tables.

For the short-run, Micro results for the logging and wood product sectors are displayed in Table

[12]This assumption of difficult substitution results in larger estimates of economic impact in response to a reduction in federal log supplies than would a less restrictive assumption.

[13]In the fixed-price model used for this study, household incomes and household consumption expenditures are also assumed endogenous. Such a model is referred to as a Type II input-output model.

9.[14] Percent changes in the same variable are summarized in Table 10. Short-run economy-wide changes in employment and factor income are presented in Table 11, while percent changes in the same measures are presented in Table 12.

The short-run impact of a reduction in logging of federal timber is mixed depending on the severity of the reduction. For reduction in federal supply up to 50 of the baseline, output of private logs increases slightly but is allocated away from export markets to supply regional mills (Tables 9 and 10). Log imports increase 34.7 percent, but total supply of logs in the region falls. For a 50 percent in federal log supply, wood processing sheds almost one fourth of baseline employment (928 jobs) largely due to the increased cost of purchasing higher priced logs. Incomes of low, medium, and high income households decline by 0.2 percent, 0.91 percent and 1.02 percent, respectively. For reductions larger than 50 percent of the baseline supply of logs from federal land, the output of private logs is reduced. At the zero supply of federal logs, the private output of logs is reduced by 20 percent with logging employment falling by 31 percent. This stems largely from the run-up in price of regionally supplied logs which chokes off demand from the wood product sector. For the 100 percent reduction in federal log supply, total log supply to the region (Q) is down 38 percent in spite of an increase in log imports of 97 percent (Table 10).

The 100 percent reduction in federal log supply is very damaging to the wood products sector. Output is reduced 56 percent relative to the baseline with a 72 percent reduction in wood products employment (Table 10). Under the assumption that households receive unemployment transfers. Incomes of low, medium, and high income households in the five county region decline by 0.6, 2.5, and 2.8 percent respectively (Table 10).

Looking at the ripple effect of the log shock on the regional economy, the agricultural sectors are basically unaffected. The higher regional prices for logs and wood products cause these production costs to go up, but these costs are offset by decreased regional price on other inputs that on balance result in slightly greater employment and income in the agricultural sectors (Tables 11 and 12). The construction sector is damaged by higher cost wood products and smaller household income and sheds about two percent of baseline jobs for the 100 percent reduction in federal log supply (Table 12). Hitech manufacturing is very little affected by the run-up in wood product cost and since most of the demand for these products is outside the local economy, and very little of the cost structure is in wood products. Overall production and employment in this sector is basically unchanged. Other manufacturing (Omanu) is a different story. Here the increased cost of logs and wood products has a measurable impact on production cost and the sector loses both jobs and factor income in the amount of roughly 8 percent of baseline figures for this sector. Next to logging and wood products, other manufacturing is the most heavily damaged sector in the economy (Table 12).

The economic impact on the service sectors' ranges between 1 and 3 percent of baseline employment and income depending on the sector. Wholesale and retail trade sectors are the most

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[14]For a description of the model sectoring scheme, see Appendix A. EMPLOY is the number of jobs in a given sector. LAB is the wage bill or labor payments, PROPR is proprietor payments, and CAP is payments to corporate capital all reserved in millions of dollars. All other variables, except prices, are measured in millions of dollars.

impacted with nearly a 3 percent reduction in income and employment, while the financial sectors (Fire) and business service sectors (Edl) are the least impacted with less than 1 percent loss in employment and factor income.

The Loss of Unemployment Benefits

The analysis summarized in Tables 13--16 makes the assumption that labor that is unemployed by the log shock eventually exhausts the benefits period and/or must leave the region to seek employment. The major consequence to the regional economy is a reduction in transfers from government to regional households that manifests itself as a reduction of household income. As the results summarized in Tables 13--16 make clear the main effect of the loss in transfer income is a direct reduction in regional household income and a reduction in household consumption demand. The reduction in regional household demand feeds back mainly in terms of induced effects in the service part of the economy. This, in turn, lowers output, employment, and income derived from that part of the economy.

The loss in unemployment benefits has the effect of approximately doubling the percent loss in household income (compare Tables 8 and 9 with Tables 13 and 14). For example, in the case of a 100 percent reduction in federal log supply, the percent loss in household income for low, medium, and high income households is 0.57 percent, 2.47 percent, and 2.79 percent. For the same shock with no unemployment compensation the loss in income is 1.28 percent, 5.59 percent, and 5.68 percent. Clearly, unemployment compensation makes a difference in measured impact of reductions in federal log supply and should be factored in to any short-run analysis of log supply impacts on regional household income.

As expected, the goods producing part of the economy is virtually unchanged by the elimination of unemployment transfers. The story is different, however, on the service sectors. Both the trade and other service sectors feel most of the impact. In the case of total elimination of federal logs, the loss of unemployment benefits reduces service sector jobs by approximately 200 jobs compared to the same shock with unemployment compensation (Tables 15 and 16) The additional loss in service sector jobs is about 1 percent of service sector jobs base.

Comparison with Fixed Price Model Results.

A standard input-output model was subjected to same log shocks as the CGE model under the assumption of no unemployment transfers in each model. As expected, the predicted loss in employment and income is greater under the IO model than the CGE model. For less severe reductions in federal log supply (50 percent reduction), the IO total employment impacts are roughly 64 percent greater than the CGE impacts (Table 17). As the supply reduction become more severe the CGE results begin to approach the IO results. For example in the case of an 80 percent federal log supply reduction, the IO employment impacts are roughly 36 percent greater than the CGE employment impacts.

Turning to impacts on household income, the same magnitude of difference between IO and CGE results as noted with employment also obtains with household income. The estimated loss in

regional household income for a 50 percent reduction in federal log supply is 68 percent greater in the IO model results than CGE model results (Table 18). For the 80 percent log shock the IO model results are roughly 40 percent greater than CGE results (Table 18).

The Impacts of National Price Effects

Assuming that the reduction in access to federal timber supplies is played out not just in Northeast Oregon but throughout the entire West; then it becomes appropriate to consider log and wood product price effects at the national level. Logs from federal lands account for less than 20 percent of national soft wood log supply (Adams, 1997). Even in the case of a moderate reduction in log supply from federal lands in the West, total log supply will decline and product price will increase in national markets, ceteris paribus, for both logs and wood products. Accordingly, the results summarized in Table 19-22 show the regional impact of a 50 percent reduction in federal log supply that is accompanied by modest price increases in the price of both logs and wood products at the national level. In the regional CGE model, national prices are treated as exogenous and industries in the region are treated as price takers. Changes in national prices are simulated in the model as changes in the export price and the import price of logs and wood products.

The professional literature on the elasticity of demand for logs and for wood products indicates that the short-run demand elasticity for both products is quite inelastic (Adams; Haynes, Adams, and Mills, 1995). The hypothesized 50 percent reduction of federal log supply (relative to the 1992 baseline) translates roughly into a 5 to 10 percent reduction in national softwood log supply. As national log prices increase, private log harvest will increase to take advantage of the price increase and so instead of a 10 percent reduction of national log supply, perhaps the public plus private reduction may be more on the order of 2 or 3 percent of supply. With a national price elasticity of demand for logs of between -.15 and -.25, the expected national log price increase would be expected to conservatively range between 5 and 15 percent. Accordingly, national log price shocks in the range of 5 to 15 percent were simulated with the CGE model.

The expected price effect in the wood product market is more difficult to predict. The lumber and wood products price elasticity of demand is estimated as -.15 (Adams, 1997; Haynes, Adams, and Mills, 1995). On the assumption that substitutes for wood products are readily available, the range of possible increases in wood products price stemming from a 50 percent reduction in forest service log supply was limited to a maximum of 6 percent.

What the simulated national price changes show is that relatively modest increases in the national log price and wood product price more than mitigate the impact of the 50 percent reduction in federal log supply. Log price increases (exports and imports) by themselves are very beneficial to the logging sector, but harmful to downstream sectors that use logs as an intermediate input. A 5 percent increase in national log price (with the 50 percent reduction in federal log supply) results in a 19 percent increase in private log output (Table 20). The wood products sector, however, is damaged by the national log price increase. Output declines by 37 percent relative to the baseline and employment declines by 40 percent (Table 20). In terms of changes in regional household income, the change in income is almost unchanged from the change from the federal log shock with no national price effect. The increased income and employment in logging is almost offset by

decreased employment and income in wood products. However, when the national price increase extends to the wood product sector as well, the story is very different.

Assuming a 5 percent increase in log price and a 3 percent increase in wood product price, instead of the above noted 37 percent output decline, model results indicate only a 14 percent decline in wood products output. Logging output increases by 18 percent, but the increase in imported logs increases by a remarkable 80 percent. The increase in wood product price allows increased log imports even in the face of an increased price for imported logs.

In a scenario where log prices are increased by 5 percent and wood products prices are increased by 6 percent, the negative regional household income effects of the federal log shock are totally mitigated. Regional household income is actually increased by 1 percent over the baseline level (Table 20) where as regional employment is increased by 1.3 percent. Employment in the logging sector is increased by 32 percent over baseline levels and employment in the wood products sector is increased by 15 percent over baseline levels. The regional sector that is most damaged by the higher log and wood product prices is other manufacturing which sheds 9 percent of jobs and income (Table 22). No other regional sector is damaged by as much as 1 percent in either income or employment (Table 22).

SUMMARY AND CONCLUSIONS

The results presented here emphasize the complexity of the answer to the question of how dependent is the Northeast Oregon on logging and wood product industries. Data show that in 1992, 7 percent of regional employment was logging and wood product based. Consequently, by most accounts, a sustained severe reduction in the availability of public timber resources will have dramatic impacts on the existing regional economic structure. Our findings paint a somewhat different picture.

Log Response on Private Lands

For moderate reductions in the supply of federal logs, production of logs on private land responds to the supply deficit and the output of private logs increases. For reductions in federal log supply greater than 50 percent of the base, the private output of logs begins to decline as a function of the decrease in regional log demand that stems from the run up in regional log price. The increase in regional log price harms the competitiveness of the regional wood products sector. It is reductions in output, employment, and income in wood products that define most of the damage that stems from reduction in federal log supply.

Unemployment Compensation

The treatment of unemployment transfers made some difference in the regional assessment of the log shocks. Unemployment compensation supports household income which, in turn, supports household consumption. Household consumption affects the regional economy mainly through the production of trade and services. The difference between counting unemployment transfers and not counting them was typically a difference of several hundred jobs in the trade and service

sectors on a service and trade employment base for the region of approximately 25 thousand jobs. The percent error of not including unemployment transfers would be to overstate the employment loss in trade and services by about 1 percent.

Comparison to Results with An IO Model

For moderate (50 percent reduction) reduction in federal log supply, the IO results are much more pessimistic than the CGE results. The magnitude of induced and indirect effects in the IO model was often on the order of 2 to 3 times as great as equivalent induced and indirect effects in the CGE model. For the more severe scenarios (reductions of 80 percent or greater) the logging and wood products impacts began to approach the IO results but the indirect and induced effects of the IO model were still on the order of twice those of the GGE model. Most of the difference can be attributed fixed response nature of the IO model relative to flexible price response nature of the CGE model. It is important to keep in mind the very different assumptions that each model makes in the treatment of capital. In the IO framework both capital and labor are assumed perfectly mobile. In the CGE model for this study, capital was assumed fixed by sector and only labor was allowed to adjust across sectors or out of the region. If capital had been assumed to be more mobile out of the region the CGE results would have been more like the IO results or even more pessimistic. The framework for this study was the intermediate run. The results of this study indicate that economic impacts estimated from an IO model should be interpreted with great caution involving reductions in timber from the federal forest.

National Price Effects

When log shocks were assumed to be West-wide and therefore to translate into national price effects for logs and wood products, much of the damage to regional economy in the moderate (50 percent) log shock scenario was largely mitigated by higher log and wood product prices. Especially important were price effects in the wood products sector. Since most regional models are fixed price in nature it is likely that the relationship between federal log supply reductions and national price effects has not been given the attention it deserves in regional economic impact analysis. When the national price effect is combined with flexible price response of the CGE framework the story of regional impact of supply shocks becomes much less pessimistic than the IO story. On balance the CGE story is more consistent with economic theory and should be a more accurate story. Having said this, it should be noted that this analysis may be too optimistic regarding private log output response to price increases. Output levels for all sectors are determined by the condition of marginal factor price equal to value of marginal product. In the case of logging these conditions may generate more log output than could be sustained from private forest land. On the other hand the wood products sector is not under such a severe constraint and it is the price effect for this sector that mitigates much of economic damage stemming from the log shock.

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Table 1. Annual Oregon Timber Harvests (MMBF Scribner rule)

	1988		*1993*		*Change*	*1988*	*to*	*1993*
	West	*East*	*West*	*East*	*West*	*percent*	*East*	*percent*
USFS	2,238	1,250	416	686	-1,822	-81	-564	-45
BLM	1,399	40	339	23	-1,060	-76	-17	-43
Private	2,754	505	2,847	762	+93	+3	+257	+51
Total	6,391	1,795	3,602	1,471	-2,789	-44	-324	-18

(Source: Oregon Department of Forestry)

Table 2. The Northeast Oregon Regional Economy--1992
(Baker, Grant, Umatilla, Union, and Wallowa Counties)

FULL AND PART-TIME EMPLOYMENT	*State*		*Region*	
	Jobs	*Percent*	*Jobs*	*Percent*
Livestock Related	24,461	1.5	5,353	8.9
Other Agriculture	42,454	2.6	3,744	6.3
Food Processing	25,053	1.6	2,792	4.7
Logging and Wood Processing	81,074	5.0	4,101	6.8
Other Ag. & Nat. Res.	26,110	1.6	1,484	2.5
Other Employment	1,420,848	87.7	42,294	70.8
Total	1,620,000	100	59,768	100

(Source: IMPLAN and Bureau of Economic Analysis, Regional Economic Information System, U.S. Dept. of Commerce, Washington, D.C. [REIS CD-ROM])

Table 3. Total and Per Capita Personal Income Over Time
(Baker, Grant, Umatilla, Union, and Wallowa Counties)

Year	*1969*	*1974*	*1979*	*1984*	*1989*	*1990*	*1991*	*1992*
Total personal income ($1000)	304,105	540,576	915,643	1,251,392	1,542,637	1,632,475	1,717,510	1,818,414
Population (Thousands)	92.2	97.9	111.8	116.8	112	113.3	114.7	116.1
Per capita personal income ($)	3,298	5,522	8,190	10,714	13,774	14,408	14,974	15,662
Total employment (Jobs)	41,093	45,749	54,569	53,336	57,049	59,146	59,644	59,768

(Source: Bureau of Economic Analysis, Regional Economic Information System, U.S. Dept. of Commerce, Washington, D.C. [REIS CD-ROM])

Table 4. Components of Per Capita Personal Income Over Time
(Baker, Grant, Umatilla, Union, and Wallowa Counties)

Year	*1969*	*1974*	*1979*	*1984*	*1989*	*1990*	*1991*	*1992*
Employee Compensation per Capita	1,922	2,782	4,636	5,478	6,913	7,482	7,742	8,092
Dividend Interest and Rent per Capita	409	688	1,194	2,009	2,435	2,466	2,407	2,399
Transfers per Capita	365	751	1,223	2,008	2,735	2,985	3,276	3,548
Proprietors per Capita	720	1,439	1,150	1,374	2,040	1,823	1,933	2,005
Residence Adjustment per Capita	-12	45	260	243	247	264	263	286
PERSONAL INCOME PER CAPITA	3,403	5,705	8,462	11,112	14,369	15,021	15,622	16,329
% Employee Compensation	56.47	48.76	54.78	49.30	48.11	49.81	49.56	49.55
% Div. Interest and Rent	12.03	12.07	14.11	18.08	16.95	16.42	15.41	14.69
% Transfers	10.71	13.17	14.45	18.07	19.03	19.88	20.97	21.73
% Proprietors	21.16	25.22	13.59	12.37	14.20	12.14	12.38	12.28
% Residence Adjustment	-0.37	0.78	3.07	2.18	1.72	1.76	1.69	1.75
TOTAL PERCENT	100	100	100	100	100	100	100	100

(Source: Bureau of Economic Analysis, Regional Economic Information System, U.S. Dept. of Commerce, Washington, D.C. [REIS CD-ROM])

Table 5. Transfer Payments Over Time
(Baker, Grant, Umatilla, Union, and Wallowa Counties)

Year	*1969*	*1974*	*1979*	*1984*	*1989*	*1990*	*1991*	*1992*
Total transfers ($000)	33,616	73,570	136,708	234,538	306,274	338,253	375,711	411,901
Govt. payments to indiv.	31,379	70,284	129,275	224,075	293,006	324,519	361,095	396,131
Ret. & disab. ins. benefit	20,902	45,439	84,076	141,695	172,305	186,536	201,275	213,747
Medical payments	3,628	7,797	19,178	40,322	71,190	82,387	95,117	106,395
Income maint. benefits	1,628	5,319	9,961	15,303	22,071	24,721	28,937	32,766
Unemploy. ins. benefit	1,621	5,070	6,553	15,023	13,687	16,581	21,893	28,100
Veterans benefits	3,387	5,899	7,539	9,061	9,558	9,891	9,785	10,519
Fed. edu.& trng. assist.	72	291	1,167	2,268	3,702	3,764	3,529	3,897
Other payments to individual	65	379	716	359	427	553	507	696
Payments to nonprofit institutions	1,484	2,037	4,555	5,647	6,699	6,973	8,015	8,790
Business payments to individuals	753	1,249	2,878	4,816	6,569	6,761	6,601	6,980
Population (thousands)	92.2	97.9	111.8	116.8	112	113.3	114.7	116.1
Transfers per cap.($)	365	751	1223	2008	2735	2985	3276	3548

(Source: Bureau of Economic Analysis, Regional Economic Information System, U.S. Dept. of Commerce, Washington, D.C. [REIS CD-ROM])

Table 6. Sectoral Composition of Employment Over Time (# Jobs)
(Baker, Grant, Umatilla, Union, and Wallowa Counties)

	1969	*1974*	*1979*	*1984*	*1989*	*1990*	*1991*	*1992*
Farm Employment	6,756	7,106	6,539	6,783	6,955	7,169	6,998	6,493
Non-farm Employment	34,337	38,643	48,030	46,553	50,094	51,977	52,646	53,275
Private	26,112	29,951	38,140	36,904	39,250	40,764	41,374	41,739
Ag. serv.& other ANR	534	708	783	935	1,205	1,231	1,336	1,308
Mining	109	142	180	68	146	181	159	153
Construction	1,391	1,643	2,284	1,781	1,600	1,838	1,878	1,810
Manufacturing	6,292	6,854	8,716	7,915	8,191	8,681	8,642	8,506
Transp. and pub. utils.	2,376	2,701	3,298	2,982	3,187	3,291	3,268	3,285
Wholesale trade	1,212	1,419	2,030	1,869	2,087	2,165	2,068	2,212
Retail trade	6,252	7,303	9,058	8,746	9,471	9,446	9,528	9,637
Fin., insur.& real est.	1,938	2,208	2,963	2,784	2,533	2,491	2,486	2,494
Services	5,996	6,963	8,820	9,601	10,818	11,437	12,005	12,335
Govt. and govt. enter.	8,225	8,692	9,890	9,649	10,844	11,213	11,272	11,536
Federal, civilian	1,970	1,534	2,027	2,005	2,258	2,334	2,240	2,402
Military	553	554	494	569	561	554	552	542
State and local	5,702	6,604	7,369	7,075	8,025	8,325	8,480	8,592
Total Non-Farm Employment	34,337	38,643	48,030	46,553	50,094	51,977	52,646	53,275

(Source: Bureau of Economic Analysis, Regional Economic Information System, U.S. Dept. of Commerce, Washington, D.C. [REIS CD-ROM])

Table 7. Characteristics of Regional Employment Over Time (# Jobs)
(Baker, Grant, Umatilla, Union, and Wallowa Counties)

	1969	*1978*	*1979*	*1984*	*1989*	*1990*	*1991*	*1992*
Total employment	41,093	45,749	54,569	53,336	57,049	59,146	59,644	59,768
Wage and salary	30,687	34,620	42,546	39,801	43,071	44,960	44,829	44,601
Proprietors	10,406	11,129	12,023	13,535	13,978	14,186	14,815	15,167
Farm	4,469	4,304	3,851	4,353	4,377	4,293	4,336	4,393
Non-farm	5,937	6,825	8,172	9,182	9,601	9,893	10,479	10,774

(Source: Bureau of Economic Analysis, Regional Economic Information System, U.S. Dept. of Commerce, Washington, DC [REIS CD-ROM])

Table 8. Main Features of Alternative Modeling Specifications

Model Type	*Labor Supply*	*Other Factor Supplies*	*Savings-Investment Behavior*	*Comments*
Short-run CGE	Perfectly Elastic Regional Labor Supply; Fixed Wage Rate	Fixed Sector Supplies of "Capital" and "Proprietors;" Endogenous Factor Returns	Fixed Investment Level (maintained by variation in flow of outside funds)	"Labor" is intersectorally mobile.
Intermediate-run CGE	Perfectly Elastic Regional Labor Supply; Fixed Wage Rate	Same as Above	Fixed Investment Level (maintained by variation in flow of outside funds)	Same as above except "Labor" is also interregionally mobile.
National Price Effect CGE	Same as Above	Same as Above	Same as Above	Log prices and Wood Product price assumed to increase nationally.

9. Logging and Wood Products Impacts--Short-Run

Micro Affects: Very Short Run

Industry	Variable	Base	0.9*FS	0.8*FS	0.7*FS	0.6*FS	0.5*FS	0.4*FS	0.3*FS	0.2*FS	0.1*FS	0.0*FS
LOGGING												
	X	158.15	160.77	161.69	161.43	160.15	157.88	154.56	150.06	144.15	136.44	126.21
	XD	112.61	110.10	106.17	101.30	95.65	89.33	82.35	74.70	66.33	57.13	46.92
	XXD	19.10	24.16	28.17	31.44	34.08	36.11	37.52	38.27	38.24	37.27	35.07
	Q	129.23	127.52	124.59	120.88	116.55	111.72	106.42	100.63	94.33	87.40	79.59
	PX	1.00	1.01	1.01	1.02	1.02	1.03	1.03	1.04	1.04	1.04	1.05
	PD	1.00	1.01	1.03	1.06	1.08	1.11	1.15	1.19	1.23	1.29	1.36
	PDD	1.00	1.05	1.09	1.12	1.15	1.17	1.19	1.21	1.22	1.23	1.24
	E	139.05	136.48	133.12	129.24	124.94	120.25	115.16	109.61	103.51	96.65	88.67
	M	16.62	17.42	18.42	19.58	20.90	22.39	24.07	25.93	28.00	30.27	32.67
	EMPLOY	1169.00	1201.54	1213.13	1209.87	1193.85	1165.63	1124.91	1070.67	1001.07	913.07	801.41
	LAB	28.89	29.69	29.98	29.90	29.50	28.81	27.80	26.46	24.74	22.57	19.81
	PROPR	2.47	2.54	2.56	2.56	2.52	2.46	2.38	2.26	2.12	1.93	1.69
	CAP	16.98	17.45	17.62	17.57	17.34	16.93	16.34	15.55	14.54	13.26	11.64
WOOD Products												
	X	317.36	305.23	289.68	272.00	252.73	232.17	210.46	187.69	163.82	138.67	111.77
	XD	47.93	46.99	45.77	44.37	42.80	41.10	39.24	37.23	35.01	32.53	29.64
	XXD	47.92	46.98	45.76	44.36	42.79	41.09	39.23	37.22	35.00	32.52	29.63
	Q	83.95	82.79	81.29	79.59	77.71	75.71	73.58	71.34	68.96	66.44	63.74
	PX	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01
	PD	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.03	1.04
	PDD	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.03	1.04
	E	269.44	258.24	243.92	227.64	209.92	191.05	171.18	150.40	128.70	105.98	81.90
	M	36.02	35.80	35.52	35.22	34.91	34.61	34.34	34.11	33.95	33.91	34.10
	EMPLOY	2932.00	2796.53	2624.71	2431.60	2224.19	2006.54	1781.29	1550.22	1314.35	1073.71	826.48
	LAB	81.51	77.74	72.97	67.60	61.83	55.78	49.52	43.10	36.54	29.85	22.98
	PROPR	5.97	5.69	5.34	4.95	4.53	4.09	3.63	3.16	2.68	2.19	1.68
	CAP	11.42	10.89	10.22	9.47	8.66	7.82	6.94	6.04	5.12	4.18	3.22
Regional Household Income Affects												
	Low	453.38	453.29	453.13	452.93	452.70	452.45	452.17	451.87	451.55	451.19	450.79
	Medium	880.83	879.95	878.57	876.87	874.94	872.80	870.48	867.98	865.27	862.34	859.11
	High	492.05	491.50	490.64	489.58	488.36	487.02	485.55	483.96	482.25	480.39	478.33

10. Logging and Wood Products (Short-Run)--Percent Change

Micro Affects: Very Short Run

Industry	Variable	Base	0.9*FS	0.8*FS	0.7*FS	0.6*FS	0.5*FS	0.4*FS	0.3*FS	0.2*FS	0.1*FS	0.0*FS
LOGGING												
	X	0.00%	1.66%	2.24%	2.07%	1.26%	-0.17%	-2.27%	-5.12%	-8.85%	-13.73%	-20.20%
	XD	0.00%	-2.23%	-5.72%	-10.04%	-15.06%	-20.67%	-26.87%	-33.66%	-41.10%	-49.27%	-58.33%
	XXD	0.00%	26.49%	47.49%	64.61%	78.43%	89.06%	96.44%	100.37%	100.21%	95.13%	83.61%
	Q	0.00%	-1.32%	-3.59%	-6.46%	-9.81%	-13.55%	-17.65%	-22.13%	-27.01%	-32.37%	-38.41%
	PX	0.00%	1.00%	1.00%	2.00%	2.00%	3.00%	3.00%	4.00%	4.00%	4.00%	5.00%
	PD	0.00%	1.00%	3.00%	6.00%	8.00%	11.00%	15.00%	19.00%	23.00%	29.00%	36.00%
	PDD	0.00%	5.00%	9.00%	12.00%	15.00%	17.00%	19.00%	21.00%	22.00%	23.00%	24.00%
	E	0.00%	-1.85%	-4.26%	-7.06%	-10.15%	-13.52%	-17.18%	-21.17%	-25.56%	-30.49%	-36.23%
	M	0.00%	4.81%	10.83%	17.81%	25.75%	34.72%	44.83%	56.02%	68.47%	82.13%	96.57%
	EMPLOY	0.00%	2.78%	3.78%	3.50%	2.13%	-0.29%	-3.77%	-8.41%	-14.37%	-21.89%	-31.44%
	LAB	0.00%	2.77%	3.77%	3.50%	2.11%	-0.28%	-3.77%	-8.41%	-14.36%	-21.88%	-31.43%
	PROPR	0.00%	2.83%	3.64%	3.64%	2.02%	-0.40%	-3.64%	-8.50%	-14.17%	-21.86%	-31.58%
	CAP	0.00%	2.77%	3.77%	3.47%	2.12%	-0.29%	-3.77%	-8.42%	-14.37%	-21.91%	-31.45%
WOOD Products												
	X	0.00%	-3.82%	-8.72%	-14.29%	-20.36%	-26.84%	-33.68%	-40.86%	-48.38%	-56.31%	-64.78%
	XD	0.00%	-1.96%	-4.51%	-7.43%	-10.70%	-14.25%	-18.13%	-22.32%	-26.96%	-32.13%	-38.16%
	XXD	0.00%	-1.96%	-4.51%	-7.43%	-10.71%	-14.25%	-18.13%	-22.33%	-26.96%	-32.14%	-38.17%
	Q	0.00%	-1.38%	-3.17%	-5.19%	-7.43%	-9.82%	-12.35%	-15.02%	-17.86%	-20.86%	-24.07%
	PX	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%
	PD	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%	1.00%	2.00%	2.00%	3.00%	4.00%
	PDD	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%	1.00%	2.00%	2.00%	3.00%	4.00%
	E	0.00%	-4.16%	-9.47%	-15.51%	-22.09%	-29.09%	-36.47%	-44.18%	-52.23%	-60.67%	-69.60%
	M	0.00%	-0.61%	-1.39%	-2.22%	-3.08%	-3.91%	-4.66%	-5.30%	-5.75%	-5.86%	-5.33%
	EMPLOY	0.00%	-4.62%	-10.48%	-17.07%	-24.14%	-31.56%	-39.25%	-47.13%	-55.17%	-63.38%	-71.81%
	LAB	0.00%	-4.63%	-10.48%	-17.07%	-24.14%	-31.57%	-39.25%	-47.12%	-55.17%	-63.38%	-71.81%
	PROPR	0.00%	-4.69%	-10.55%	-17.09%	-24.12%	-31.49%	-39.20%	-47.07%	-55.11%	-63.32%	-71.86%
	CAP	0.00%	-4.64%	-10.51%	-17.08%	-24.17%	-31.52%	-39.23%	-47.11%	-55.17%	-63.40%	-71.80%
Regional Household Income Affects												
	Low	0.00%	-0.02%	-0.06%	-0.10%	-0.15%	-0.21%	-0.27%	-0.33%	-0.40%	-0.48%	-0.57%
	Medium	0.00%	-0.10%	-0.26%	-0.45%	-0.67%	-0.91%	-1.18%	-1.46%	-1.77%	-2.10%	-2.47%
	High	0.00%	-0.11%	-0.29%	-0.50%	-0.75%	-1.02%	-1.32%	-1.64%	-1.99%	-2.37%	-2.79%

Ta Economy-Wide Economic Impacts: Employment and Factor Payments--Short-Rum

Macro Affects Very Short Run

Scenario	Variable	LVSTOCK	FEEDLOT	CROPS	FEED	LOGGIN	OANR	CONSTR	FOOD	WOOD	HITECH	OMANU	TCU	TRADE	EDL	FIRE	OSERVS	GOVT	TOTAL
Base	EMPLOY	4123.00	970.00	3744.00	260.00	1169.00	1484.00	2798.00	2792.00	2932.00	160.00	1786.00	2785.00	8276.00	4002.00	2367.00	9603.00	11411.00	60662.00
	LAB	23.75	6.79	9.54	0.97	28.89	5.10	51.80	58.98	81.51	3.87	42.46	86.84	122.41	33.68	29.66	120.72	274.09	981.06
	PROPR	74.66	19.10	31.90	3.22	2.47	2.60	12.43	1.05	5.97	0.01	1.63	10.56	11.41	0.86	2.56	47.85	0.00	228.28
	CAP	2.33	0.59	14.50	0.48	16.98	22.70	3.56	45.88	11.42	2.31	12.09	55.19	22.00	7.83	126.34	15.24	9.83	369.27
0.9*FS	EMPLOY	4123.12	970.02	3744.43	259.99	1201.54	1483.96	2795.66	2792.37	2796.53	159.94	1780.02	2783.16	8266.14	4001.66	2366.23	9595.16	11403.51	60523.44
	LAB	23.75	6.79	9.54	0.97	29.69	5.10	51.76	58.99	77.74	3.87	42.32	86.78	122.26	33.68	29.65	120.62	273.91	977.42
	PROPR	74.66	19.10	31.90	3.22	2.54	2.60	12.42	1.05	5.69	0.01	1.62	10.55	11.40	0.86	2.56	47.81	0.00	227.99
	CAP	2.33	0.59	14.50	0.48	17.45	22.70	3.56	45.89	10.89	2.31	12.05	55.15	21.97	7.83	126.30	15.23	9.82	369.05
0.8*FS	EMPLOY	4123.26	970.05	3745.09	259.98	1213.13	1483.89	2792.44	2792.81	2624.71	159.87	1772.07	2780.80	8252.12	4001.17	2365.07	9582.00	11393.07	60311.61
	LAB	23.75	6.79	9.54	0.97	29.98	5.10	51.70	59.00	72.97	3.87	42.13	86.71	122.06	33.67	29.64	120.46	273.66	972.00
	PROPR	74.66	19.10	31.91	3.22	2.56	2.60	12.41	1.05	5.34	0.01	1.62	10.54	11.38	0.86	2.56	47.75	0.00	227.57
	CAP	2.33	0.59	14.50	0.48	17.62	22.70	3.55	45.89	10.22	2.31	12.00	55.11	21.94	7.83	126.24	15.21	9.81	368.33
0.7*FS	EMPLOY	4123.41	970.08	3745.88	259.97	1209.87	1483.79	2788.64	2793.52	2431.60	159.78	1762.63	2778.11	8235.42	4000.57	2363.67	9565.36	11380.72	60053.02
	LAB	23.75	6.79	9.54	0.97	29.90	5.10	51.63	59.01	67.60	3.86	41.90	86.63	121.81	33.67	29.62	120.25	273.36	965.39
	PROPR	74.67	19.10	31.92	3.22	2.56	2.60	12.39	1.05	4.95	0.01	1.61	10.53	11.35	0.86	2.56	47.66	0.00	227.04
	CAP	2.33	0.59	14.51	0.48	17.57	22.70	3.55	45.90	9.47	2.31	11.93	55.05	21.89	7.83	126.16	15.18	9.80	367.25
0.6*FS	EMPLOY	4123.57	970.13	3746.78	259.95	1193.85	1483.65	2784.34	2794.23	2224.19	159.68	1751.82	2775.17	8216.67	3999.89	2362.07	9545.98	11366.93	59758.90
	LAB	23.75	6.79	9.55	0.97	29.50	5.10	51.55	59.03	61.83	3.86	41.65	86.53	121.53	33.66	29.60	120.00	273.03	957.93
	PROPR	74.67	19.10	31.92	3.22	2.52	2.60	12.37	1.05	4.53	0.01	1.60	10.52	11.33	0.86	2.55	47.57	0.00	226.42
	CAP	2.33	0.59	14.51	0.48	17.34	22.69	3.54	45.92	8.66	2.31	11.86	55.00	21.84	7.83	126.08	15.15	9.79	365.92
0.5*FS	EMPLOY	4123.73	970.17	3747.77	259.93	1165.63	1483.48	2779.60	2795.01	2006.54	159.57	1739.63	2772.04	8196.17	3999.12	2360.32	9524.18	11351.90	59434.79
	LAB	23.75	6.79	9.55	0.97	28.81	5.10	51.46	59.04	55.78	3.86	41.36	86.44	121.23	33.66	29.58	119.73	272.67	949.78
	PROPR	74.67	19.10	31.93	3.22	2.46	2.60	12.35	1.05	4.09	0.01	1.59	10.51	11.30	0.86	2.55	47.46	0.00	225.75
	CAP	2.33	0.59	14.51	0.48	16.93	22.69	3.54	45.93	7.82	2.30	11.78	54.93	21.79	7.82	125.98	15.11	9.78	364.31
0.4*FS	EMPLOY	4123.90	970.23	3748.83	259.91	1124.91	1483.28	2774.40	2795.86	1781.29	159.44	1725.95	2768.73	8174.04	3998.29	2358.42	9500.05	11335.73	59083.26
	LAB	23.76	6.79	9.55	0.97	27.80	5.10	51.36	59.06	49.52	3.86	41.03	86.33	120.90	33.65	29.55	119.43	272.28	940.94
	PROPR	74.68	19.10	31.94	3.22	2.38	2.60	12.33	1.05	3.63	0.01	1.58	10.50	11.27	0.86	2.55	47.34	0.00	225.04
	CAP	2.33	0.59	14.52	0.48	16.34	22.69	3.53	45.94	6.94	2.30	11.68	54.87	21.73	7.82	125.88	15.08	9.77	362.49
0.3*FS	EMPLOY	4124.07	970.29	3749.96	259.88	1070.67	1483.02	2768.70	2796.77	1550.22	159.30	1710.55	2765.25	8150.29	3997.37	2356.38	9473.52	11318.42	58704.66
	LAB	23.76	6.79	9.56	0.97	26.46	5.10	51.26	59.08	43.10	3.85	40.67	86.22	120.55	33.64	29.53	119.09	271.87	931.50
	PROPR	74.68	19.10	31.95	3.22	2.26	2.60	12.30	1.05	3.16	0.01	1.56	10.49	11.24	0.86	2.55	47.20	0.00	224.23
	CAP	2.33	0.59	14.52	0.48	15.55	22.69	3.52	45.96	6.04	2.30	11.58	54.80	21.67	7.82	125.77	15.03	9.75	360.40
0.2*FS	EMPLOY	4124.24	970.35	3751.17	259.86	1001.07	1482.71	2762.43	2797.75	1314.35	159.13	1693.07	2761.59	8124.76	3996.35	2354.17	9444.27	11299.89	58297.16
	LAB	23.76	6.79	9.56	0.97	24.74	5.10	51.14	59.10	36.54	3.85	40.25	86.11	120.17	33.63	29.50	118.72	271.42	921.35
	PROPR	74.68	19.11	31.96	3.22	2.12	2.60	12.27	1.05	2.68	0.01	1.55	10.47	11.20	0.86	2.55	47.06	0.00	223.39
	CAP	2.33	0.59	14.53	0.48	14.54	22.68	3.51	45.97	5.12	2.30	11.46	54.73	21.60	7.82	125.66	14.99	9.73	358.04
0.1*FS	EMPLOY	4124.41	970.42	3752.45	259.83	913.07	1482.32	2755.39	2798.81	1073.71	158.94	1672.92	2757.72	8097.10	3995.23	2351.78	9411.72	11279.90	57855.72
	LAB	23.76	6.79	9.56	0.97	22.57	5.09	51.01	59.12	29.85	3.84	39.77	85.99	119.76	33.62	29.47	118.32	270.94	910.43
	PROPR	74.69	19.11	31.97	3.22	1.93	2.60	12.24	1.05	2.19	0.01	1.53	10.46	11.16	0.86	2.54	46.90	0.00	222.46
	CAP	2.33	0.59	14.53	0.48	13.26	22.67	3.51	45.99	4.18	2.29	11.32	54.65	21.52	7.82	125.53	14.94	9.72	355.33
0.0*FS	EMPLOY	4124.57	970.50	3753.84	259.79	801.41	1481.82	2747.27	2799.99	826.48	158.71	1649.00	2753.55	8066.53	3993.94	2349.13	9374.59	11257.89	57369.01
	LAB	23.76	6.79	9.57	0.97	19.81	5.09	50.86	59.15	22.98	3.84	39.20	85.86	119.31	33.61	29.44	117.85	270.41	898.50
	PROPR	74.69	19.11	31.98	3.22	1.69	2.60	12.20	1.05	1.68	0.01	1.50	10.44	11.12	0.86	2.54	46.71	0.00	221.40
	CAP	2.33	0.59	14.54	0.48	11.64	22.67	3.50	46.01	3.22	2.29	11.16	54.57	21.44	7.81	125.39	14.88	9.70	352.22

2. Economy-Wide Employment and Factor Payments–Percent Change

Macro Affects: Very Short Run

Scenario	Variable	LVSTOCK	FEEDLOT	CROPS	FEED	LOGGING	OANR	CONSTR	FOOD	WOOD	HITECH	OMANU	TCU	TRADE	EDL	FIRE	OSERVS	GOVT	TOTAL
Base	EMPLOY	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	LAB	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	PROPR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NA	0.00%
	CAP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.9*FS	EMPLOY	0.00%	0.00%	0.01%	-0.00%	2.78%	-0.00%	-0.08%	0.01%	-4.62%	-0.04%	-0.33%	-0.07%	-0.12%	-0.01%	-0.03%	-0.08%	-0.07%	-0.23%
	LAB	0.00%	0.00%	0.00%	0.00%	2.77%	0.00%	-0.08%	0.02%	-4.63%	0.00%	-0.33%	-0.07%	-0.12%	0.00%	-0.03%	-0.08%	-0.07%	-0.37%
	PROPR	0.00%	0.00%	0.00%	0.00%	2.83%	0.00%	-0.08%	0.00%	-4.69%	0.00%	-0.61%	-0.09%	-0.09%	0.00%	0.00%	-0.08%	NA	-0.13%
	CAP	0.00%	0.00%	0.00%	0.00%	2.77%	0.00%	0.00%	0.02%	-4.64%	0.00%	-0.33%	-0.07%	-0.14%	0.00%	-0.03%	-0.07%	-0.10%	-0.06%
0.8*FS	EMPLOY	0.01%	0.01%	0.03%	-0.01%	3.78%	-0.01%	-0.20%	0.03%	-10.48%	-0.08%	-0.78%	-0.15%	-0.29%	-0.02%	-0.08%	-0.22%	-0.16%	-0.58%
	LAB	0.00%	0.00%	0.00%	0.00%	3.77%	0.00%	-0.19%	0.03%	-10.48%	0.00%	-0.78%	-0.15%	-0.29%	-0.03%	-0.07%	-0.22%	-0.16%	-0.92%
	PROPR	0.00%	0.00%	0.03%	0.00%	3.64%	0.00%	-0.16%	0.00%	-10.55%	0.00%	-0.61%	-0.19%	-0.26%	0.00%	0.00%	-0.21%	NA	-0.31%
	CAP	0.00%	0.00%	0.00%	0.00%	3.77%	0.00%	-0.28%	0.02%	-10.51%	0.00%	-0.74%	-0.14%	-0.27%	0.00%	-0.08%	-0.20%	-0.20%	-0.25%
0.7*FS	EMPLOY	0.01%	0.01%	0.05%	-0.01%	3.50%	-0.01%	-0.33%	0.05%	-17.07%	-0.14%	-1.31%	-0.25%	-0.49%	-0.04%	-0.14%	-0.39%	-0.27%	-1.00%
	LAB	0.00%	0.00%	0.00%	0.00%	3.50%	0.00%	-0.33%	0.05%	-17.07%	-0.26%	-1.32%	-0.24%	-0.49%	-0.03%	-0.13%	-0.39%	-0.27%	-1.60%
	PROPR	0.01%	0.00%	0.06%	0.00%	3.64%	0.00%	-0.32%	0.00%	-17.09%	0.00%	-1.23%	-0.28%	-0.53%	0.00%	0.00%	-0.40%	NA	-0.54%
	CAP	0.00%	0.00%	0.07%	0.00%	3.47%	0.00%	-0.28%	0.04%	-17.08%	0.00%	-1.32%	-0.25%	-0.50%	0.00%	-0.14%	-0.39%	-0.31%	-0.55%
0.6*FS	EMPLOY	0.01%	0.01%	0.07%	-0.02%	2.13%	-0.02%	-0.49%	0.08%	-24.14%	-0.20%	-1.91%	-0.35%	-0.72%	-0.05%	-0.21%	-0.59%	-0.39%	-1.49%
	LAB	0.00%	0.00%	0.10%	0.00%	2.11%	0.00%	-0.48%	0.08%	-24.14%	-0.26%	-1.91%	-0.36%	-0.72%	-0.06%	-0.20%	-0.60%	-0.39%	-2.36%
	PROPR	0.01%	0.00%	0.06%	0.00%	2.02%	0.00%	-0.48%	0.00%	-24.12%	0.00%	-1.84%	-0.38%	-0.70%	0.00%	-0.39%	-0.59%	NA	-0.81%
	CAP	0.00%	0.00%	0.07%	0.00%	2.12%	-0.04%	-0.56%	0.09%	-24.17%	0.00%	-1.90%	-0.34%	-0.73%	0.00%	-0.21%	-0.59%	-0.41%	-0.91%
0.5*FS	EMPLOY	0.02%	0.02%	0.10%	-0.03%	-0.29%	-0.04%	-0.66%	0.11%	-31.56%	-0.27%	-2.60%	-0.47%	-0.96%	-0.07%	-0.28%	-0.82%	-0.52%	-2.02%
	LAB	0.00%	0.00%	0.10%	0.00%	-0.28%	0.00%	-0.66%	0.10%	-31.57%	-0.26%	-2.59%	-0.46%	-0.96%	-0.06%	-0.27%	-0.82%	-0.52%	-3.19%
	PROPR	0.01%	0.00%	0.09%	0.00%	-0.40%	0.00%	-0.64%	0.00%	-31.49%	0.00%	-2.45%	-0.47%	-0.96%	0.00%	-0.39%	-0.82%	NA	-1.11%
	CAP	0.00%	0.00%	0.07%	0.00%	-0.29%	-0.04%	-0.56%	0.11%	-31.52%	-0.43%	-2.56%	-0.47%	-0.95%	-0.13%	-0.28%	-0.85%	-0.51%	-1.34%
0.4*FS	EMPLOY	0.02%	0.02%	0.13%	-0.03%	-3.77%	-0.05%	-0.84%	0.14%	-39.25%	-0.35%	-3.36%	-0.58%	-1.23%	-0.09%	-0.36%	-1.07%	-0.66%	-2.60%
	LAB	0.04%	0.00%	0.10%	0.00%	-3.77%	0.00%	-0.85%	0.14%	-39.25%	-0.26%	-3.37%	-0.59%	-1.23%	-0.09%	-0.37%	-1.07%	-0.66%	-4.09%
	PROPR	0.03%	0.00%	0.13%	0.00%	-3.64%	0.00%	-0.80%	0.00%	-39.20%	0.00%	-3.07%	-0.57%	-1.23%	0.00%	-0.39%	-1.07%	NA	-1.42%
	CAP	0.00%	0.00%	0.14%	0.00%	-3.77%	-0.04%	-0.84%	0.13%	-39.23%	-0.43%	-3.39%	-0.58%	-1.23%	-0.13%	-0.36%	-1.05%	-0.61%	-1.84%
0.3*FS	EMPLOY	0.03%	0.03%	0.16%	-0.05%	-8.41%	-0.07%	-1.05%	0.17%	-47.13%	-0.44%	-4.22%	-0.71%	-1.52%	-0.12%	-0.45%	-1.35%	-0.81%	-3.23%
	LAB	0.04%	0.00%	0.21%	0.00%	-8.41%	0.00%	-1.04%	0.17%	-47.12%	-0.52%	-4.22%	-0.71%	-1.52%	-0.12%	-0.44%	-1.35%	-0.81%	-5.05%
	PROPR	0.03%	0.00%	0.16%	0.00%	-8.50%	0.00%	-1.05%	0.00%	-47.07%	0.00%	-4.29%	-0.66%	-1.49%	0.00%	-0.39%	-1.36%	NA	-1.77%
	CAP	0.00%	0.00%	0.14%	0.00%	-8.42%	-0.04%	-1.12%	0.17%	-47.11%	-0.43%	-4.22%	-0.71%	-1.50%	-0.13%	-0.45%	-1.38%	-0.81%	-2.40%
0.2*FS	EMPLOY	0.03%	0.04%	0.19%	-0.05%	-14.37%	-0.09%	-1.27%	0.21%	-55.17%	-0.54%	-5.20%	-0.84%	-1.83%	-0.14%	-0.54%	-1.65%	-0.97%	-3.90%
	LAB	0.04%	0.00%	0.21%	0.00%	-14.36%	0.00%	-1.27%	0.20%	-55.17%	-0.52%	-5.20%	-0.84%	-1.83%	-0.15%	-0.54%	-1.66%	-0.97%	-6.09%
	PROPR	0.03%	0.05%	0.19%	0.00%	-14.17%	0.00%	-1.29%	0.00%	-55.11%	0.00%	-4.91%	-0.85%	-1.84%	0.00%	-0.39%	-1.65%	NA	-2.14%
	CAP	0.00%	0.00%	0.21%	0.00%	-14.37%	-0.09%	-1.40%	0.20%	-55.17%	-0.43%	-5.21%	-0.83%	-1.82%	-0.13%	-0.54%	-1.64%	-1.02%	-3.04%
0.1*FS	EMPLOY	0.03%	0.04%	0.23%	-0.07%	-21.89%	-0.11%	-1.52%	0.24%	-63.38%	-0.66%	-6.33%	-0.98%	-2.16%	-0.17%	-0.64%	-1.99%	-1.15%	-4.63%
	LAB	0.04%	0.00%	0.21%	0.00%	-21.88%	-0.20%	-1.53%	0.24%	-63.38%	-0.78%	-6.34%	-0.98%	-2.16%	-0.18%	-0.64%	-1.99%	-1.15%	-7.20%
	PROPR	0.04%	0.05%	0.22%	0.00%	-21.86%	0.00%	-1.53%	0.00%	-63.32%	0.00%	-6.13%	-0.95%	-2.19%	0.00%	-0.78%	-1.99%	NA	-2.55%
	CAP	0.00%	0.00%	0.21%	0.00%	-21.91%	-0.13%	-1.40%	0.24%	-63.40%	-0.87%	-6.37%	-0.98%	-2.18%	-0.13%	-0.64%	-1.97%	-1.12%	-3.78%
0.0*FS	EMPLOY	0.04%	0.05%	0.26%	-0.08%	-31.44%	-0.15%	-1.81%	0.29%	-71.81%	-0.81%	-7.67%	-1.13%	-2.53%	-0.20%	-0.75%	-2.38%	-1.34%	-5.43%
	LAB	0.04%	0.00%	0.31%	0.00%	-31.43%	-0.20%	-1.81%	0.29%	-71.81%	-0.78%	-7.68%	-1.13%	-2.53%	-0.21%	-0.74%	-2.38%	-1.34%	-8.42%
	PROPR	0.04%	0.05%	0.25%	0.00%	-31.58%	0.00%	-1.85%	0.00%	-71.86%	0.00%	-7.98%	-1.14%	-2.54%	0.00%	-0.78%	-2.38%	NA	-3.01%
	CAP	0.00%	0.00%	0.28%	0.00%	-31.45%	-0.13%	-1.69%	0.28%	-71.80%	-0.87%	-7.69%	-1.12%	-2.55%	-0.26%	-0.75%	-2.36%	-1.32%	-4.62%

13. Logging and Wood Products Impacts--No Unemployment Benefits

Micro Affects: No Unemployment Benefit												
Industry	Variable	Base	0.9*FS	0.8*FS	0.7*FS	0.6*FS	0.5*FS	0.4*FS	0.3*FS	0.2*FS	0.1*FS	0.0*FS
LOGGING												
	X	158.15	160.77	161.71	161.45	160.18	157.92	154.61	150.12	144.22	136.51	126.29
	XD	112.61	110.10	106.18	101.31	95.67	89.35	82.37	74.72	66.35	57.15	46.94
	XXD	19.10	24.17	28.18	31.46	34.10	36.13	37.55	38.29	38.27	37.30	35.10
	Q	129.23	127.53	124.60	120.90	116.58	111.76	106.46	100.68	94.39	87.47	79.67
	PX	1.00	1.01	1.01	1.02	1.02	1.03	1.03	1.04	1.04	1.04	1.05
	PD	1.00	1.01	1.03	1.06	1.08	1.11	1.15	1.19	1.23	1.29	1.36
	PDD	1.00	1.05	1.09	1.12	1.15	1.17	1.19	1.21	1.22	1.23	1.24
	E	139.05	136.48	133.12	129.24	124.95	120.27	115.18	109.64	103.53	96.68	88.72
	M	16.62	17.43	18.42	19.59	20.91	22.41	24.09	25.96	28.04	30.32	32.73
	EMPLOY	1169.00	1201.62	1213.31	1210.16	1194.24	1166.12	1125.50	1071.34	1001.82	913.89	802.28
	LAB	28.89	29.70	29.99	29.91	29.51	28.82	27.81	26.48	24.76	22.59	19.83
	PROPR	2.47	2.54	2.56	2.56	2.52	2.46	2.38	2.26	2.12	1.93	1.70
	CAP	16.98	17.45	17.62	17.58	17.35	16.94	16.35	15.56	14.55	13.27	11.65
WOOD Products												
	X	317.36	305.25	289.73	272.08	252.84	232.31	210.63	187.89	164.04	138.91	112.03
	XD	47.93	46.99	45.77	44.36	42.79	41.08	39.23	37.21	34.99	32.51	29.61
	XXD	47.92	46.98	45.76	44.35	42.78	41.07	39.22	37.20	34.98	32.50	29.61
	Q	83.95	82.79	81.28	79.56	77.68	75.66	73.52	71.26	68.87	66.34	63.60
	PX	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.01
	PD	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.03	1.04
	PDD	1.00	1.00	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.03	1.04
	E	269.44	258.26	243.97	227.72	210.04	191.20	171.37	150.62	128.95	106.25	82.18
	M	36.02	35.80	35.51	35.20	34.89	34.58	34.29	34.05	33.88	33.83	33.99
	EMPLOY	2932.00	2796.78	2625.26	2432.47	2225.37	2008.02	1783.04	1552.20	1316.51	1075.99	828.79
	LAB	81.51	77.75	72.98	67.62	61.87	55.82	49.57	43.15	36.60	29.91	23.04
	PROPR	5.97	5.69	5.35	4.95	4.53	4.09	3.63	3.16	2.68	2.19	1.69
	CAP	11.42	10.89	10.23	9.47	8.67	7.82	6.94	6.05	5.13	4.19	3.23
Regional Household Income Affects												
	Low	453.38	453.14	452.77	452.32	451.80	451.23	450.60	449.93	449.21	448.43	447.56
	Medium	880.83	878.74	875.55	871.66	867.24	862.38	857.12	851.46	845.39	838.82	831.60
	High	492.05	490.88	489.08	486.88	484.38	481.63	478.64	475.43	471.97	468.23	464.12

e 14. Logging and Wood Products (No Unemployment Benefit)--Percent Change

Micro Affects: No Unemployment Benefit

Industry	Variable	Base	0.9*FS	0.8*FS	0.7*FS	0.6*FS	0.5*FS	0.4*FS	0.3*FS	0.2*FS	0.1*FS	0.0*FS
LOGGING												
	X	0.00%	1.66%	2.25%	2.09%	1.28%	-0.15%	-2.24%	-5.08%	-8.81%	-13.68%	-20.15%
	XD	0.00%	-2.23%	-5.71%	-10.03%	-15.04%	-20.66%	-26.85%	-33.65%	-41.08%	-49.25%	-58.32%
	XXD	0.00%	26.54%	47.54%	64.71%	78.53%	89.16%	96.60%	100.47%	100.37%	95.29%	83.77%
	Q	0.00%	-1.32%	-3.58%	-6.45%	-9.79%	-13.52%	-17.62%	-22.09%	-26.96%	-32.31%	-38.35%
	PX	0.00%	1.00%	1.00%	2.00%	2.00%	3.00%	3.00%	4.00%	4.00%	4.00%	5.00%
	PD	0.00%	1.00%	3.00%	6.00%	8.00%	11.00%	15.00%	19.00%	23.00%	29.00%	36.00%
	PDD	0.00%	5.00%	9.00%	12.00%	15.00%	17.00%	19.00%	21.00%	22.00%	23.00%	24.00%
	E	0.00%	-1.85%	-4.26%	-7.06%	-10.14%	-13.51%	-17.17%	-21.15%	-25.54%	-30.47%	-36.20%
	M	0.00%	4.87%	10.83%	17.87%	25.81%	34.84%	44.95%	56.20%	68.71%	82.43%	96.93%
	EMPLOY	0.00%	2.79%	3.79%	3.52%	2.16%	-0.25%	-3.72%	-8.35%	-14.30%	-21.82%	-31.37%
	LAB	0.00%	2.80%	3.81%	3.53%	2.15%	-0.24%	-3.74%	-8.34%	-14.30%	-21.81%	-31.36%
	PROPR	0.00%	2.83%	3.64%	3.64%	2.02%	-0.40%	-3.64%	-8.50%	-14.17%	-21.86%	-31.17%
	CAP	0.00%	2.77%	3.77%	3.53%	2.18%	-0.24%	-3.71%	-8.36%	-14.31%	-21.85%	-31.39%
WOOD Products												
	X	0.00%	-3.82%	-8.71%	-14.27%	-20.33%	-26.80%	-33.63%	-40.80%	-48.31%	-56.23%	-64.70%
	XD	0.00%	-1.96%	-4.51%	-7.45%	-10.72%	-14.29%	-18.15%	-22.37%	-27.00%	-32.17%	-38.22%
	XXD	0.00%	-1.96%	-4.51%	-7.45%	-10.73%	-14.29%	-18.16%	-22.37%	-27.00%	-32.18%	-38.21%
	Q	0.00%	-1.38%	-3.18%	-5.23%	-7.47%	-9.87%	-12.42%	-15.12%	-17.96%	-20.98%	-24.24%
	PX	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%
	PD	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%	1.00%	2.00%	2.00%	3.00%	4.00%
	PDD	0.00%	0.00%	0.00%	0.00%	1.00%	1.00%	1.00%	2.00%	2.00%	3.00%	4.00%
	E	0.00%	-4.15%	-9.45%	-15.48%	-22.05%	-29.04%	-36.40%	-44.10%	-52.14%	-60.57%	-69.50%
	M	0.00%	-0.61%	-1.42%	-2.28%	-3.14%	-4.00%	-4.80%	-5.47%	-5.94%	-6.08%	-5.64%
	EMPLOY	0.00%	-4.61%	-10.46%	-17.04%	-24.10%	-31.51%	-39.19%	-47.06%	-55.10%	-63.30%	-71.73%
	LAB	0.00%	-4.61%	-10.46%	-17.04%	-24.10%	-31.52%	-39.19%	-47.06%	-55.10%	-63.31%	-71.73%
	PROPR	0.00%	-4.69%	-10.39%	-17.09%	-24.12%	-31.49%	-39.20%	-47.07%	-55.11%	-63.32%	-71.69%
	CAP	0.00%	-4.64%	-10.42%	-17.08%	-24.08%	-31.52%	-39.23%	-47.02%	-55.08%	-63.31%	-71.72%
Regional Household Income Effects												
	Low	0.00%	-0.05%	-0.13%	-0.23%	-0.35%	-0.47%	-0.61%	-0.76%	-0.92%	-1.09%	-1.28%
	Medium	0.00%	-0.24%	-0.60%	-1.04%	-1.54%	-2.09%	-2.69%	-3.33%	-4.02%	-4.77%	-5.59%
	High	0.00%	-0.24%	-0.60%	-1.05%	-1.56%	-2.12%	-2.73%	-3.38%	-4.08%	-4.84%	-5.68%

le 15. Regional Economic Impacts: Employment and Factor--No Unemployment Benefit

Macro Affects: No Unemployment Benefit

Scenario	Variable	LVSTOCK	FEEDLOT	CROPS	FEED	LOGGING	OANR	CONSTR	FOOD	WOOD	HITECH	OMANU	TCU	TRADE	EDL	FIRE	OSERVS	GOVT	TOTAL
Base	EMPLOY	4123.00	970.00	3744.00	260.00	1169.00	1484.00	2798.00	2792.00	2932.00	160.00	1786.00	2785.00	8276.00	4002.00	2367.00	9603.00	11411.00	60662.00
	LAB	23.75	6.79	9.54	0.97	28.89	5.10	51.80	58.98	81.51	3.87	42.46	86.84	122.41	33.68	29.66	120.72	274.09	981.06
	PROPR	74.66	19.10	31.90	3.22	2.47	2.60	12.43	1.05	5.97	0.01	1.63	10.56	11.41	0.86	2.56	47.85	0.00	228.28
	CAP	2.33	0.59	14.50	0.48	16.98	22.70	3.56	45.88	11.42	2.31	12.09	55.19	22.00	7.83	126.34	15.24	9.83	369.27
0.9*FS	EMPLOY	4123.14	970.03	3744.65	260.00	1201.62	1484.00	2795.72	2792.44	2796.78	159.95	1780.11	2783.13	8262.80	4001.01	2365.65	9590.87	11401.51	60513.41
	LAB	23.75	6.79	9.54	0.97	29.70	5.10	51.76	58.99	77.75	3.87	42.32	86.78	122.21	33.67	29.64	120.57	273.86	977.27
	PROPR	74.66	19.10	31.91	3.22	2.54	2.60	12.42	1.05	5.69	0.01	1.62	10.55	11.39	0.86	2.56	47.79	0.00	227.97
	CAP	2.33	0.59	14.50	0.48	17.45	22.70	3.56	45.89	10.89	2.31	12.05	55.15	21.96	7.83	126.27	15.22	9.82	369.00
0.8*FS	EMPLOY	4123.31	970.07	3745.63	259.99	1213.31	1483.99	2792.59	2793.08	2625.26	159.88	1772.29	2780.72	8243.77	3999.54	2363.62	9571.29	11388.06	60286.40
	LAB	23.75	6.79	9.54	0.97	29.99	5.10	51.70	59.00	72.98	3.87	42.13	86.71	121.93	33.66	29.62	120.32	273.54	971.60
	PROPR	74.67	19.10	31.91	3.22	2.56	2.60	12.41	1.05	5.35	0.01	1.62	10.54	11.37	0.86	2.56	47.69	0.00	227.52
	CAP	2.33	0.59	14.51	0.48	17.62	22.70	3.55	45.90	10.23	2.31	12.00	55.11	21.91	7.83	126.16	15.19	9.81	368.23
0.7*FS	EMPLOY	4123.50	970.12	3746.82	259.98	1210.16	1483.95	2788.89	2793.84	2432.47	159.80	1763.01	2777.97	8221.01	3997.74	2361.17	9546.91	11372.08	60009.42
	LAB	23.75	6.79	9.55	0.97	29.91	5.10	51.63	59.02	67.62	3.87	41.91	86.62	121.60	33.64	29.59	120.01	273.16	964.74
	PROPR	74.67	19.10	31.92	3.22	2.56	2.60	12.39	1.05	4.95	0.01	1.61	10.53	11.33	0.86	2.55	47.57	0.00	226.92
	CAP	2.33	0.59	14.51	0.48	17.58	22.70	3.55	45.91	9.47	2.31	11.93	55.05	21.85	7.82	126.03	15.15	9.80	367.06
0.6*FS	EMPLOY	4123.70	970.18	3748.17	259.97	1194.24	1483.90	2784.71	2794.71	2225.37	159.70	1752.38	2774.97	8195.42	3995.69	2358.40	9518.80	11354.16	59694.47
	LAB	23.75	6.79	9.55	0.97	29.51	5.10	51.55	59.04	61.87	3.86	41.66	86.53	121.22	33.63	29.55	119.66	272.72	956.96
	PROPR	74.67	19.10	31.94	3.22	2.52	2.60	12.37	1.05	4.53	0.01	1.60	10.52	11.30	0.86	2.55	47.43	0.00	226.27
	CAP	2.33	0.59	14.52	0.48	17.35	22.70	3.54	45.92	8.67	2.31	11.86	54.99	21.79	7.82	125.88	15.11	9.78	365.64
0.5*FS	EMPLOY	4123.91	970.25	3749.65	259.96	1166.12	1483.81	2780.09	2795.66	2008.02	159.60	1740.39	2771.76	8167.42	3993.42	2355.37	9487.48	11334.61	59347.52
	LAB	23.76	6.79	9.55	0.97	28.82	5.10	51.47	59.06	55.82	3.86	41.38	86.43	120.80	33.61	29.51	119.27	272.26	948.46
	PROPR	74.68	19.10	31.95	3.22	2.46	2.60	12.35	1.05	4.09	0.01	1.59	10.51	11.26	0.86	2.55	47.27	0.00	225.55
	CAP	2.33	0.59	14.52	0.48	16.94	22.70	3.54	45.94	7.82	2.30	11.78	54.93	21.71	7.81	125.72	15.06	9.76	363.93
0.4*FS	EMPLOY	4124.13	970.33	3751.24	259.95	1125.50	1483.70	2775.03	2796.69	1783.04	159.48	1726.91	2768.38	8137.21	3990.93	2352.11	9453.14	11313.56	58971.33
	LAB	23.76	6.79	9.56	0.97	27.81	5.10	51.37	59.08	49.57	3.86	41.06	86.32	120.36	33.59	29.47	118.84	271.75	939.26
	PROPR	74.68	19.11	31.96	3.22	2.38	2.60	12.33	1.05	3.63	0.01	1.58	10.50	11.22	0.86	2.54	47.10	0.00	224.77
	CAP	2.33	0.59	14.53	0.48	16.35	22.70	3.53	45.96	6.94	2.30	11.69	54.86	21.63	7.81	125.55	15.00	9.75	362.00
0.3*FS	EMPLOY	4124.35	970.41	3752.94	259.93	1071.34	1483.54	2769.48	2797.80	1552.20	159.35	1711.73	2764.83	8104.81	3988.22	2348.62	9415.73	11291.02	58566.30
	LAB	23.76	6.79	9.56	0.97	26.48	5.10	51.27	59.10	43.15	3.85	40.69	86.21	119.88	33.56	29.43	118.37	271.21	929.38
	PROPR	74.68	19.10	31.98	3.22	2.26	2.60	12.30	1.05	3.16	0.01	1.56	10.48	11.17	0.86	2.54	46.92	0.00	223.89
	CAP	2.33	0.59	14.53	0.48	15.56	22.69	3.52	45.98	6.05	2.30	11.59	54.79	21.54	7.80	125.36	14.94	9.73	359.78
0.2*FS	EMPLOY	4124.58	970.50	3754.76	259.92	1001.82	1483.34	2763.36	2799.00	1316.51	159.19	1694.49	2761.09	8070.04	3985.26	2344.89	9374.93	11266.88	58130.56
	LAB	23.76	6.79	9.57	0.97	24.76	5.10	51.16	59.13	36.60	3.85	40.28	86.09	119.36	33.54	29.38	117.85	270.63	918.82
	PROPR	74.69	19.11	31.99	3.22	2.12	2.60	12.28	1.05	2.68	0.01	1.55	10.47	11.13	0.86	2.54	46.71	0.00	223.01
	CAP	2.33	0.59	14.54	0.48	14.55	22.69	3.52	46.00	5.13	2.30	11.47	54.72	21.45	7.80	125.16	14.88	9.71	357.32
0.1*FS	EMPLOY	4124.81	970.60	3756.70	259.90	913.89	1483.06	2756.51	2800.30	1075.99	159.01	1674.59	2757.14	8032.46	3982.01	2340.87	9330.03	11240.84	57658.71
	LAB	23.76	6.79	9.57	0.97	22.59	5.10	51.03	59.16	29.91	3.85	39.81	85.97	118.81	33.51	29.33	117.29	270.00	907.45
	PROPR	74.69	19.11	32.01	3.22	1.93	2.60	12.25	1.05	2.19	0.01	1.53	10.45	11.07	0.86	2.53	46.49	0.00	221.99
	CAP	2.33	0.59	14.55	0.48	13.27	22.69	3.51	46.02	4.19	2.30	11.34	54.64	21.35	7.79	124.95	14.81	9.68	354.49
0.0*FS	EMPLOY	4125.04	970.71	3758.80	259.87	802.28	1482.69	2748.57	2801.74	828.79	158.79	1650.95	2752.88	7991.04	3978.35	2336.46	9279.54	11212.21	57138.71
	LAB	23.76	6.79	9.58	0.97	19.83	5.10	50.88	59.19	23.04	3.84	39.25	85.84	118.20	33.48	29.28	116.65	269.32	895.00
	PROPR	74.70	19.11	32.03	3.22	1.70	2.60	12.21	1.05	1.69	0.01	1.51	10.44	11.02	0.85	2.53	46.24	0.00	220.91
	CAP	2.33	0.59	14.56	0.48	11.65	22.68	3.50	46.04	3.23	2.29	11.18	54.55	21.24	7.78	124.71	14.73	9.66	351.20

5. **Economy-Wide Economic Impacts: Employment and Factor Payments--Percent Change**

Macro Affects: No Unemployment Benefit

Scenario	Variable	LVSTOCK	FEEDLOT	CROPS	FEED	LOGGING	OANR	CONSTR	FOOD	WOOD	HITECH	OMANU	TCU	TRADE	EDL	FIRE	OSERVS	GOVT	TOTAL
Base	EMPLOY	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	LAB	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	PROPR	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	NA	0.00%
	CAP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.9*FS	EMPLOY	0.00%	0.00%	0.02%	0.00%	2.79%	0.00%	-0.08%	0.02%	-4.61%	-0.03%	-0.33%	-0.07%	-0.16%	-0.02%	-0.06%	-0.13%	-0.08%	-0.24%
	LAB	0.00%	0.00%	0.00%	0.00%	2.80%	0.00%	-0.08%	0.02%	-4.61%	0.00%	-0.33%	-0.07%	-0.16%	-0.03%	-0.07%	-0.12%	-0.08%	-0.39%
	PROPR	0.00%	0.00%	0.03%	0.00%	2.83%	0.00%	-0.08%	0.00%	-4.69%	0.00%	-0.61%	-0.09%	-0.18%	0.00%	0.00%	-0.13%	NA	-0.14%
	CAP	0.00%	0.00%	0.00%	0.00%	2.77%	0.00%	0.00%	0.02%	-4.64%	0.00%	-0.33%	-0.07%	-0.18%	0.00%	-0.06%	-0.13%	-0.10%	-0.07%
0.8*FS	EMPLOY	0.01%	0.01%	0.04%	-0.00%	3.79%	-0.00%	-0.19%	0.04%	-10.46%	-0.08%	-0.77%	-0.15%	-0.39%	-0.06%	-0.14%	-0.33%	-0.20%	-0.62%
	LAB	0.00%	0.00%	0.00%	0.00%	3.81%	0.00%	-0.19%	0.03%	-10.46%	0.00%	-0.78%	-0.15%	-0.39%	-0.06%	-0.13%	-0.33%	-0.20%	-0.96%
	PROPR	0.01%	0.00%	0.03%	0.00%	3.64%	0.00%	-0.16%	0.00%	-10.39%	0.00%	-0.61%	-0.19%	-0.35%	0.00%	0.00%	-0.33%	NA	-0.33%
	CAP	0.00%	0.00%	0.07%	0.00%	3.77%	0.00%	-0.28%	0.04%	-10.42%	0.00%	-0.74%	-0.14%	-0.41%	0.00%	-0.14%	-0.33%	-0.20%	-0.28%
0.7*FS	EMPLOY	0.01%	0.01%	0.08%	-0.01%	3.52%	-0.00%	-0.33%	0.07%	-17.04%	-0.12%	-1.29%	-0.25%	-0.66%	-0.11%	-0.25%	-0.58%	-0.34%	-1.08%
	LAB	0.00%	0.00%	0.10%	0.00%	3.53%	0.00%	-0.33%	0.07%	-17.04%	0.00%	-1.30%	-0.25%	-0.66%	-0.12%	-0.24%	-0.59%	-0.34%	-1.66%
	PROPR	0.01%	0.00%	0.06%	0.00%	3.64%	0.00%	-0.32%	0.00%	-17.09%	0.00%	-1.23%	-0.28%	-0.70%	0.00%	-0.39%	-0.59%	NA	-0.60%
	CAP	0.00%	0.00%	0.07%	0.00%	3.53%	0.00%	-0.28%	0.07%	-17.08%	0.00%	-1.32%	-0.25%	-0.68%	-0.13%	-0.25%	-0.59%	-0.31%	-0.60%
0.6*FS	EMPLOY	0.02%	0.02%	0.11%	-0.01%	2.16%	-0.01%	-0.47%	0.10%	-24.10%	-0.19%	-1.88%	-0.36%	-0.97%	-0.16%	-0.36%	-0.88%	-0.50%	-1.59%
	LAB	0.00%	0.00%	0.10%	0.00%	2.15%	0.00%	-0.48%	0.10%	-24.10%	-0.26%	-1.88%	-0.36%	-0.97%	-0.15%	-0.37%	-0.88%	-0.50%	-2.46%
	PROPR	0.01%	0.00%	0.13%	0.00%	2.02%	0.00%	-0.48%	0.00%	-24.12%	0.00%	-1.84%	-0.38%	-0.96%	0.00%	-0.39%	-0.88%	NA	-0.88%
	CAP	0.00%	0.00%	0.14%	0.00%	2.18%	0.00%	-0.56%	0.09%	-24.08%	0.00%	-1.90%	-0.36%	-0.95%	-0.13%	-0.36%	-0.85%	-0.51%	-0.98%
0.5*FS	EMPLOY	0.02%	0.03%	0.15%	-0.02%	-0.25%	-0.01%	-0.64%	0.13%	-31.51%	-0.25%	-2.55%	-0.48%	-1.31%	-0.21%	-0.49%	-1.20%	-0.67%	-2.17%
	LAB	0.04%	0.00%	0.10%	0.00%	-0.24%	0.00%	-0.64%	0.14%	-31.52%	-0.26%	-2.54%	-0.47%	-1.32%	-0.21%	-0.51%	-1.20%	-0.67%	-3.32%
	PROPR	0.03%	0.00%	0.16%	0.00%	-0.40%	0.00%	-0.64%	0.00%	-31.49%	0.00%	-2.45%	-0.47%	-1.31%	0.00%	-0.39%	-1.21%	NA	-1.20%
	CAP	0.00%	0.00%	0.14%	0.00%	-0.24%	0.00%	-0.56%	0.13%	-31.52%	-0.43%	-2.56%	-0.47%	-1.32%	-0.26%	-0.49%	-1.18%	-0.71%	-1.45%
0.4*FS	EMPLOY	0.03%	0.03%	0.19%	-0.02%	-3.72%	-0.02%	-0.82%	0.17%	-39.19%	-0.33%	-3.31%	-0.60%	-1.68%	-0.28%	-0.63%	-1.56%	-0.85%	-2.79%
	LAB	0.04%	0.00%	0.21%	0.00%	-3.74%	0.00%	-0.83%	0.17%	-39.19%	-0.26%	-3.30%	-0.60%	-1.67%	-0.27%	-0.64%	-1.56%	-0.85%	-4.26%
	PROPR	0.03%	0.05%	0.19%	0.00%	-3.64%	0.00%	-0.80%	0.00%	-39.20%	0.00%	-3.07%	-0.57%	-1.67%	0.00%	-0.78%	-1.57%	NA	-1.54%
	CAP	0.00%	0.00%	0.21%	0.00%	-3.71%	0.00%	-0.84%	0.17%	-39.23%	-0.43%	-3.31%	-0.60%	-1.68%	-0.26%	-0.63%	-1.57%	-0.81%	-1.97%
0.3*FS	EMPLOY	0.03%	0.04%	0.24%	-0.03%	-8.35%	-0.03%	-1.02%	0.21%	-47.06%	-0.41%	-4.16%	-0.72%	-2.07%	-0.34%	-0.78%	-1.95%	-1.05%	-3.45%
	LAB	0.04%	0.00%	0.21%	0.00%	-8.34%	0.00%	-1.02%	0.20%	-47.06%	-0.52%	-4.17%	-0.73%	-2.07%	-0.36%	-0.78%	-1.95%	-1.05%	-5.27%
	PROPR	0.03%	0.00%	0.25%	0.00%	-8.50%	0.00%	-1.05%	0.00%	-47.07%	0.00%	-4.29%	-0.76%	-2.10%	0.00%	-0.78%	-1.94%	NA	-1.92%
	CAP	0.00%	0.00%	0.21%	0.00%	-8.36%	-0.04%	-1.12%	0.22%	-47.02%	-0.43%	-4.14%	-0.72%	-2.09%	-0.38%	-0.78%	-1.97%	-1.02%	-2.57%
0.2*FS	EMPLOY	0.04%	0.05%	0.29%	-0.03%	-14.30%	-0.04%	-1.24%	0.25%	-55.10%	-0.51%	-5.12%	-0.86%	-2.49%	-0.42%	-0.93%	-2.37%	-1.26%	-4.17%
	LAB	0.04%	0.00%	0.31%	0.00%	-14.30%	0.00%	-1.24%	0.25%	-55.10%	-0.52%	-5.13%	-0.86%	-2.49%	-0.42%	-0.94%	-2.38%	-1.26%	-6.34%
	PROPR	0.04%	0.05%	0.28%	0.00%	-14.17%	0.00%	-1.21%	0.00%	-55.11%	0.00%	-4.91%	-0.85%	-2.45%	0.00%	-0.78%	-2.38%	NA	-2.31%
	CAP	0.00%	0.00%	0.28%	0.00%	-14.31%	-0.04%	-1.12%	0.26%	-55.08%	-0.43%	-5.13%	-0.85%	-2.50%	-0.38%	-0.93%	-2.36%	-1.22%	-3.24%
0.1*FS	EMPLOY	0.04%	0.06%	0.34%	-0.04%	-21.82%	-0.06%	-1.48%	0.30%	-63.30%	-0.62%	-6.24%	-1.00%	-2.94%	-0.50%	-1.10%	-2.84%	-1.49%	-4.95%
	LAB	0.04%	0.00%	0.31%	0.00%	-21.81%	0.00%	-1.49%	0.31%	-63.31%	-0.52%	-6.24%	-1.00%	-2.94%	-0.50%	-1.11%	-2.84%	-1.49%	-7.50%
	PROPR	0.04%	0.05%	0.34%	0.00%	-21.86%	0.00%	-1.45%	0.00%	-63.32%	0.00%	-6.13%	-1.04%	-2.98%	0.00%	-1.17%	-2.84%	NA	-2.76%
	CAP	0.00%	0.00%	0.34%	0.00%	-21.85%	-0.04%	-1.40%	0.31%	-63.31%	-0.43%	-6.20%	-1.00%	-2.95%	-0.51%	-1.10%	-2.82%	-1.53%	-4.00%
0.0*FS	EMPLOY	0.05%	0.07%	0.40%	-0.05%	-31.37%	-0.09%	-1.77%	0.35%	-71.73%	-0.76%	-7.56%	-1.15%	-3.44%	-0.59%	-1.29%	-3.37%	-1.74%	-5.81%
	LAB	0.04%	0.00%	0.42%	0.00%	-31.36%	0.00%	-1.78%	0.36%	-71.73%	-0.78%	-7.56%	-1.15%	-3.44%	-0.59%	-1.28%	-3.37%	-1.74%	-8.77%
	PROPR	0.05%	0.05%	0.41%	0.00%	-31.17%	0.00%	-1.77%	0.00%	-71.69%	0.00%	-7.36%	-1.14%	-3.42%	-1.16%	-1.17%	-3.36%	NA	-3.23%
	CAP	0.00%	0.00%	0.41%	0.00%	-31.39%	-0.09%	-1.69%	0.35%	-71.72%	-0.87%	-7.53%	-1.16%	-3.45%	-0.64%	-1.29%	-3.35%	-1.73%	-4.89%

Table 17. Results: Comparative Aggregate Employment Impacts

(# of Jobs)

	Model Configuration	
LOG SHOCKS:	Intermediate-Run (CGE)	Fixed-Price (IO)
50% Reduction		
Logging & Wood Products	-928	-1,246
Other	-387	-914
Total	-1,315	-2,160
Employment Multiplier	1.42	1.73
80% Reduction		
Logging & Wood Products	-1,786	-1,993
Other	-746	-1,460
Total	-2,582	-3,453
Employment Multiplier	1.42	1.73

Table 18. Results: Comparative Aggregate Income Impacts (1 million of $)

	Model Configuration	
LOG SHOCKS:	Intermediate-Run (CGE)	Fixed-Price (IO)
Moderate (-50%)		
Household Income		
Low Income hhs.	-2.15	-3.92
Med. Income hhs.	-18.45	-30.39
High Income hhs.	-10.42	-17.92
Total	-31.02	-52.23
Severe (-80%)		
Household Income		
Low Income hhs.	-4.17	-6.260
Med. Income hhs.	-35.44	-48.590
High Income hhs.	-20.08	-28.65
Total	59.69	-83.500

19. Logging and Wood Product Impacts--National Price change

Micro Affects: Price Change and No Unemployment Benefit

Industry	Variable	0.5*FS	Pr_1	Pr_2	Pr_3	Pr_4	Pr_5	Pr_6	Pr_7	Pr_8	Pr_9	Base
LOGGING												
	X	157.92	186.60	187.22	215.35	214.11	245.23	242.53	187.44	217.81	248.83	158.15
	XD	89.35	98.62	104.45	101.53	106.90	104.50	109.41	92.89	96.39	99.90	112.61
	XXD	36.13	48.97	57.46	53.18	61.11	57.54	64.91	40.93	45.81	50.81	19.10
	Q	111.76	128.50	146.35	129.96	145.76	132.09	146.14	114.40	117.48	120.98	129.23
	PX	1.03	1.09	1.11	1.14	1.15	1.19	1.20	1.08	1.13	1.17	1.00
	PD	1.11	1.21	1.28	1.25	1.32	1.29	1.36	1.15	1.19	1.24	1.00
	PDD	1.17	1.28	1.34	1.31	1.37	1.35	1.41	1.21	1.26	1.31	1.00
	E	120.27	134.63	124.71	159.39	148.42	185.08	173.44	145.02	170.53	196.56	139.05
	M	22.41	29.88	41.90	28.43	38.86	27.59	36.73	21.51	21.09	21.08	16.62
	EMPLOY	1166.12	1541.85	1550.43	1959.59	1940.73	2435.35	2390.72	1553.47	1997.12	2495.61	1169.00
	LAB	28.82	38.10	38.32	48.43	47.96	60.19	59.08	38.39	49.36	61.68	28.89
	PROPR	2.46	3.26	3.28	4.14	4.10	5.15	5.05	3.28	4.22	5.27	2.47
	CAP	16.94	22.40	22.52	28.46	28.19	35.37	34.73	22.56	29.01	36.25	16.98
WOOD Products												
	X	232.31	272.39	356.46	236.77	314.82	202.29	274.77	201.10	170.52	140.83	317.36
	XD	41.08	43.92	49.90	41.08	46.80	38.22	43.74	38.47	35.76	32.93	47.93
	XXD	41.07	43.91	49.89	41.07	46.79	38.21	43.73	38.46	35.75	32.92	47.92
	Q	75.66	78.49	85.45	75.18	81.57	71.98	77.85	72.77	69.93	67.17	83.95
	PX	1.00	1.03	1.06	1.03	1.06	1.03	1.06	1.00	1.00	1.01	1.00
	PD	1.01	1.03	1.06	1.04	1.06	1.04	1.06	1.01	1.02	1.03	1.00
	PDD	1.01	1.03	1.06	1.04	1.06	1.04	1.06	1.01	1.02	1.03	1.00
	E	191.20	228.48	306.57	195.67	268.03	164.03	231.04	162.59	134.67	107.74	269.44
	M	34.58	34.57	35.55	34.10	34.77	33.76	34.11	34.30	34.17	34.24	36.02
	EMPLOY	2008.02	2435.80	3375.91	2054.89	2903.52	1697.65	2461.70	1685.62	1379.88	1094.05	2932.00
	LAB	55.82	67.72	93.85	57.13	80.72	47.20	68.44	46.86	38.36	30.41	81.51
	PROPR	4.09	4.96	6.87	4.18	5.91	3.46	5.01	3.43	2.81	2.23	5.97
	CAP	7.82	9.49	13.15	8.00	11.31	6.61	9.59	6.57	5.37	4.26	11.42
Household Income Affects												
	Low	451.23	452.85	454.82	452.90	454.61	453.12	454.60	451.34	451.60	452.02	453.38
	Medium	862.38	875.73	892.60	875.47	890.20	876.58	889.34	862.71	864.25	867.02	880.83
	High	481.63	489.27	498.79	489.26	497.56	490.04	497.21	481.94	482.95	484.67	492.05
	Prices											
	Logs	1.00	1.05	1.05	1.10	1.10	1.15	1.15	1.05	1.10	1.15	
	Lumber	1.00	1.03	1.06	1.03	1.06	1.03	1.06	1.00	1.00	1.00	

20. Logging and Wood Product Impacts (National Price Change)--Percent Change

Micro Affects: Price Change and No Unemployment Benefit

Industry	Variable	0.5*FS	Pr_1	Pr_2	Pr_3	Pr_4	Pr_5	Pr_6	Pr_7	Pr_8	Pr_9	Base
LOGGING												
	X	-0.15%	17.99%	18.38%	36.17%	35.38%	55.06%	53.35%	18.52%	37.72%	57.34%	0.00%
	XD	-20.66%	-12.42%	-7.25%	-9.84%	-5.07%	-7.20%	-2.84%	-17.51%	-14.40%	-11.29%	0.00%
	XXD	89.16%	156.39%	200.84%	178.43%	219.95%	201.26%	239.84%	114.29%	139.84%	166.02%	0.00%
	Q	-13.52%	-0.56%	13.25%	0.56%	12.79%	2.21%	13.09%	-11.48%	-9.09%	-6.38%	0.00%
	PX	3.00%	9.00%	11.00%	14.00%	15.00%	19.00%	20.00%	8.00%	13.00%	17.00%	0.00%
	PD	11.00%	21.00%	28.00%	25.00%	32.00%	29.00%	36.00%	15.00%	19.00%	24.00%	0.00%
	PDD	17.00%	28.00%	34.00%	31.00%	37.00%	35.00%	41.00%	21.00%	26.00%	31.00%	0.00%
	E	-13.51%	-3.18%	-10.31%	14.63%	6.74%	33.10%	24.73%	4.29%	22.64%	41.36%	0.00%
	M	34.84%	79.78%	152.11%	71.06%	133.81%	66.00%	121.00%	29.42%	26.90%	26.84%	0.00%
	EMPLOY	-0.25%	31.89%	32.63%	67.63%	66.02%	108.33%	104.51%	32.89%	70.84%	113.48%	0.00%
	LAB	-0.24%	31.88%	32.64%	67.64%	66.01%	108.34%	104.50%	32.88%	70.85%	113.50%	0.00%
	PROPR	-0.40%	31.98%	32.79%	67.61%	65.99%	108.50%	104.45%	32.79%	70.85%	113.36%	0.00%
	CAP	-0.24%	31.92%	32.63%	67.61%	66.02%	108.30%	104.53%	32.86%	70.85%	113.49%	0.00%
WOOD Products												
	X	-26.80%	-14.17%	12.32%	-25.39%	-0.80%	-36.26%	-13.42%	-36.63%	-46.27%	-55.62%	0.00%
	XD	-14.29%	-8.37%	4.11%	-14.29%	-2.36%	-20.26%	-8.74%	-19.74%	-25.39%	-31.30%	0.00%
	XXD	-14.29%	-8.37%	4.11%	-14.29%	-2.36%	-20.26%	-8.74%	-19.74%	-25.40%	-31.30%	0.00%
	Q	-9.87%	-6.50%	1.79%	-10.45%	-2.84%	-14.26%	-7.27%	-13.32%	-16.70%	-19.99%	0.00%
	PX	0.00%	3.00%	6.00%	3.00%	6.00%	3.00%	6.00%	0.00%	0.00%	1.00%	0.00%
	PD	1.00%	3.00%	6.00%	4.00%	6.00%	4.00%	6.00%	1.00%	2.00%	3.00%	0.00%
	PDD	1.00%	3.00%	6.00%	4.00%	6.00%	4.00%	6.00%	1.00%	2.00%	3.00%	0.00%
	E	-29.04%	-15.20%	13.78%	-27.38%	-0.52%	-39.12%	-14.25%	-39.66%	-50.02%	-60.01%	0.00%
	M	-4.00%	-4.03%	-1.30%	-5.33%	-3.47%	-6.27%	-5.30%	-4.78%	-5.14%	-4.94%	0.00%
	EMPLOY	-31.51%	-16.92%	15.14%	-29.92%	-0.97%	-42.10%	-16.04%	-42.51%	-52.94%	-62.69%	0.00%
	LAB	-31.52%	-16.92%	15.14%	-29.91%	-0.97%	-42.09%	-16.03%	-42.51%	-52.94%	-62.69%	0.00%
	PROPR	-31.49%	-16.92%	15.08%	-29.98%	-1.01%	-42.04%	-16.08%	-42.55%	-52.93%	-62.65%	0.00%
	CAP	-31.52%	-16.90%	15.15%	-29.95%	-0.96%	-42.12%	-16.02%	-42.47%	-52.98%	-62.70%	0.00%
Household Income Affects												
	Low	-0.47%	-0.12%	0.32%	-0.11%	0.27%	-0.06%	0.27%	-0.45%	-0.39%	-0.30%	0.00%
	Medium	-2.09%	-0.58%	1.34%	-0.61%	1.06%	-0.48%	0.97%	-2.06%	-1.88%	-1.57%	0.00%
	High	-2.12%	-0.56%	1.37%	-0.57%	1.12%	-0.41%	1.05%	-2.05%	-1.85%	-1.50%	0.00%
	Prices											
	Logs	1.00	1.05	1.05	1.10	1.10	1.15	1.15	1.05	1.10	1.15	
	Lumber	1.00	1.03	1.06	1.03	1.06	1.03	1.06	1.00	1.00	1.00	

e 21. Economy-Wide Economic Impacts: Employment and Factor Payments National Price Changes

Macro Affects: Price Change and No Unemployment Benefit

Scenario	Variable	LVSTOCK	FEEDLOT	CROPS	FEED	LOGGING	OANR	CONSTR	FOOD	WOOD	HITECH	OMANU	TCU	TRADE	EDL	FIRE	OSERVS	GOVT	TOTAL
0.5*FS	EMPLOY	4123.91	970.25	3749.65	259.96	1166.12	1483.81	2780.09	2795.66	2008.02	159.60	1740.39	2771.76	8167.42	3993.42	2355.37	9487.48	11334.61	59347.52
	LAB	23.76	6.79	9.55	0.97	28.82	5.10	51.47	59.06	55.82	3.86	41.38	86.43	120.80	33.61	29.51	119.27	272.26	948.46
	PROPR	74.68	19.10	31.95	3.22	2.46	2.60	12.35	1.05	4.09	0.01	1.59	10.51	11.26	0.86	2.55	47.27	0.00	225.55
	CAP	2.33	0.59	14.52	0.48	16.94	22.70	3.54	45.94	7.82	2.30	11.78	54.93	21.71	7.81	125.72	15.06	9.76	363.93
Price_1	EMPLOY	4123.52	970.03	3743.10	259.98	1541.85	1482.04	2772.85	2792.84	2435.80	158.92	1675.72	2776.08	8231.76	3995.88	2362.96	9571.94	11379.46	60274.73
	LAB	23.75	6.79	9.54	0.97	38.10	5.09	51.33	59.00	67.72	3.84	39.84	86.56	121.76	33.63	29.61	120.33	273.33	971.19
	PROPR	74.67	19.10	31.89	3.22	3.26	2.60	12.32	1.05	4.96	0.01	1.53	10.53	11.35	0.86	2.56	47.70	0.00	227.61
	CAP	2.33	0.59	14.50	0.48	22.40	22.67	3.53	45.89	9.49	2.29	11.34	55.01	21.88	7.82	126.12	15.19	9.80	371.33
Price_2	EMPLOY	4122.56	969.77	3735.35	260.00	1550.43	1480.08	2772.01	2789.02	3375.91	158.41	1629.60	2787.09	8327.46	4000.12	2373.23	9669.59	11448.57	61449.20
	LAB	23.75	6.79	9.52	0.97	38.32	5.09	51.32	58.92	93.85	3.83	38.74	86.91	123.17	33.66	29.74	121.56	274.99	1001.13
	PROPR	74.65	19.10	31.83	3.22	3.28	2.59	12.31	1.05	6.87	0.01	1.49	10.57	11.48	0.86	2.57	48.18	0.00	230.06
	CAP	2.33	0.59	14.47	0.48	22.52	22.64	3.53	45.83	13.15	2.29	11.03	55.23	22.14	7.83	126.67	15.35	9.86	375.94
Price_3	EMPLOY	4123.99	970.02	3743.40	259.98	1959.59	1482.04	2767.11	2793.41	2054.89	158.70	1656.64	2770.78	8215.25	3995.40	2362.28	9576.33	11365.10	60254.91
	LAB	23.76	6.79	9.54	0.97	48.43	5.09	51.23	59.01	57.13	3.84	39.38	86.40	121.51	33.62	29.60	120.38	272.99	969.67
	PROPR	74.68	19.10	31.89	3.22	4.14	2.60	12.29	1.05	4.18	0.01	1.51	10.51	11.33	0.86	2.55	47.72	0.00	227.64
	CAP	2.33	0.59	14.50	0.48	28.46	22.67	3.52	45.90	8.00	2.29	11.21	54.91	21.84	7.82	126.09	15.20	9.79	375.60
Price_4	EMPLOY	4123.09	969.79	3736.30	260.00	1940.73	1480.18	2765.51	2789.92	2903.52	158.22	1611.92	2780.82	8300.63	3998.77	2371.28	9661.54	11427.24	61279.46
	LAB	23.75	6.79	9.52	0.97	47.96	5.09	51.20	58.94	80.72	3.83	38.32	86.71	122.77	33.65	29.71	121.46	274.48	995.87
	PROPR	74.66	19.10	31.83	3.22	4.10	2.59	12.29	1.05	5.91	0.01	1.47	10.54	11.44	0.86	2.56	48.14	0.00	229.77
	CAP	2.33	0.59	14.47	0.48	28.19	22.64	3.52	45.85	11.31	2.28	10.91	55.11	22.07	7.82	126.57	15.33	9.84	379.31
Price_5	EMPLOY	4124.43	970.00	3743.36	259.97	2435.35	1481.97	2761.32	2793.84	1697.65	158.46	1636.16	2765.69	8203.56	3995.56	2362.32	9587.17	11353.80	60330.61
	LAB	23.76	6.79	9.54	0.97	60.19	5.09	51.12	59.02	47.20	3.83	38.90	86.24	121.34	33.63	29.60	120.52	272.72	970.46
	PROPR	74.69	19.10	31.89	3.22	5.15	2.60	12.27	1.05	3.46	0.01	1.49	10.49	11.31	0.86	2.55	47.77	0.00	227.91
	CAP	2.33	0.59	14.50	0.48	35.37	22.67	3.51	45.91	6.61	2.29	11.08	54.81	21.81	7.82	126.09	15.21	9.78	380.86
Price_6	EMPLOY	4123.59	969.80	3736.86	259.99	2390.72	1480.21	2759.11	2790.66	2461.70	158.01	1593.22	2774.85	8279.57	3998.14	2370.16	9661.28	11409.58	61217.45
	LAB	23.75	6.79	9.52	0.97	59.08	5.09	51.08	58.95	68.44	3.82	37.88	86.52	122.46	33.65	29.70	121.45	274.06	993.21
	PROPR	74.67	19.10	31.84	3.22	5.05	2.59	12.26	1.05	5.01	0.01	1.45	10.52	11.41	0.86	2.56	48.14	0.00	229.74
	CAP	2.33	0.59	14.47	0.48	34.73	22.64	3.51	45.86	9.59	2.28	10.79	54.99	22.01	7.82	126.51	15.33	9.83	383.76
Price_7	EMPLOY	4124.34	970.23	3749.68	259.96	1553.47	1483.80	2775.07	2796.05	1685.62	159.38	1721.11	2767.14	8155.54	3993.09	2355.12	9496.84	11323.61	59370.05
	LAB	23.76	6.79	9.55	0.97	38.39	5.10	51.38	59.07	46.86	3.86	40.92	86.28	120.63	33.61	29.51	119.39	271.99	948.06
	PROPR	74.68	19.10	31.95	3.22	3.28	2.60	12.33	1.05	3.43	0.01	1.57	10.49	11.24	0.86	2.55	47.32	0.00	225.68
	CAP	2.33	0.59	14.52	0.48	22.56	22.70	3.53	45.95	6.57	2.30	11.65	54.84	21.68	7.81	125.71	15.07	9.75	368.04
Price_8	EMPLOY	4124.75	970.20	3749.41	259.96	1997.12	1483.71	2769.86	2796.34	1379.88	159.14	1700.17	2762.63	8147.58	3993.34	2355.48	9511.44	11315.07	59476.08
	LAB	23.76	6.79	9.55	0.97	49.36	5.10	51.28	59.07	38.36	3.85	40.42	86.14	120.51	33.61	29.52	119.57	271.79	949.65
	PROPR	74.69	19.10	31.95	3.22	4.22	2.60	12.31	1.05	2.81	0.01	1.55	10.48	11.23	0.86	2.55	47.39	0.00	226.02
	CAP	2.33	0.59	14.52	0.48	29.01	22.70	3.52	45.95	5.37	2.30	11.51	54.75	21.66	7.81	125.72	15.09	9.75	373.06
Price_9	EMPLOY	4125.14	970.16	3748.83	259.96	2495.61	1483.53	2764.45	2796.50	1094.05	158.88	1677.43	2758.25	8143.72	3994.18	2356.46	9531.38	11309.14	59667.67
	LAB	23.76	6.79	9.55	0.97	61.68	5.10	51.18	59.08	30.41	3.84	39.88	86.01	120.45	33.61	29.53	119.82	271.64	953.30
	PROPR	74.70	19.10	31.94	3.22	5.27	2.60	12.28	1.05	2.23	0.01	1.53	10.46	11.23	0.86	2.55	47.49	0.00	226.52
	CAP	2.33	0.59	14.52	0.48	36.25	22.69	3.52	45.95	4.26	2.29	11.36	54.66	21.65	7.81	125.78	15.13	9.74	379.01

22. Regional Economic Impacts: Employment and Factor Payments (National Price Changes)--Percent Change

Macro Affects. Price Change and No Unemployment Benefit

Scenario	Variable	LVSTOCK	FEEDLOT	CROPS	FEED	LOGGING	OANR	CONSTR	FOOD	WOOD	HITECH	OMANU	TCU	TRADE	EDL	FIRE	OSERVS	GOVT	TOTAL
0.5*FS	EMPLOY	0.02%	0.03%	0.15%	-0.02%	-0.25%	-0.01%	-0.64%	0.13%	-31.51%	-0.25%	-2.55%	-0.48%	-1.31%	-0.21%	-0.49%	-1.20%	-0.67%	-2.17%
	LAB	0.04%	0.00%	0.10%	0.00%	-0.24%	0.00%	-0.64%	0.14%	-31.52%	-0.26%	-2.54%	-0.47%	-1.32%	-0.21%	-0.51%	-1.20%	-0.67%	-3.32%
	PROPR	0.03%	0.00%	0.16%	0.00%	-0.40%	0.00%	-0.64%	0.00%	-31.49%	0.00%	-2.45%	-0.47%	-1.31%	0.00%	-0.39%	-1.21%	NA	-1.20%
	CAP	0.00%	0.00%	0.14%	0.00%	-0.24%	0.00%	-0.56%	0.13%	-31.52%	-0.43%	-2.56%	-0.47%	-1.32%	-0.26%	-0.49%	-1.18%	-0.71%	-1.45%
Price_1	EMPLOY	0.01%	0.00%	-0.02%	-0.01%	31.89%	-0.13%	-0.90%	0.03%	-16.92%	-0.68%	-6.17%	-0.32%	-0.53%	-0.15%	-0.17%	-0.32%	-0.28%	-0.64%
	LAB	0.00%	0.00%	0.00%	0.00%	31.88%	-0.20%	-0.91%	0.03%	-16.92%	-0.78%	-6.17%	-0.32%	-0.53%	-0.15%	-0.17%	-0.32%	-0.28%	-1.01%
	PROPR	0.01%	0.00%	-0.03%	0.00%	31.98%	0.00%	-0.88%	0.00%	-16.92%	0.00%	-6.13%	-0.28%	-0.53%	0.00%	0.00%	-0.31%	NA	-0.29%
	CAP	0.00%	0.00%	0.00%	0.00%	31.92%	-0.13%	-0.84%	0.02%	-16.90%	-0.87%	-6.20%	-0.33%	-0.55%	-0.13%	-0.17%	-0.33%	-0.31%	0.56%
Price_2	EMPLOY	-0.01%	-0.02%	-0.23%	0.00%	32.63%	-0.26%	-0.93%	-0.11%	15.14%	-0.99%	-8.76%	0.08%	0.62%	-0.05%	0.26%	0.69%	0.33%	1.30%
	LAB	0.00%	0.00%	-0.21%	0.00%	32.64%	-0.20%	-0.93%	-0.10%	15.14%	-1.03%	-8.76%	0.08%	0.62%	-0.06%	0.27%	0.70%	0.33%	2.05%
	PROPR	-0.01%	0.00%	-0.22%	0.00%	32.79%	-0.38%	-0.97%	0.00%	15.08%	0.00%	-8.59%	0.09%	0.61%	0.00%	0.39%	0.69%	NA	0.78%
	CAP	0.00%	0.00%	-0.21%	0.00%	32.63%	-0.26%	-0.84%	-0.11%	15.15%	-0.87%	-8.77%	0.07%	0.64%	0.00%	0.26%	0.72%	0.31%	1.81%
Price_3	EMPLOY	0.02%	0.00%	-0.02%	-0.01%	67.63%	-0.13%	-1.10%	0.05%	-29.92%	-0.81%	-7.24%	-0.51%	-0.73%	-0.16%	-0.20%	-0.28%	-0.40%	-0.67%
	LAB	0.04%	0.00%	0.00%	0.00%	67.64%	-0.20%	-1.10%	0.05%	-29.91%	-0.78%	-7.25%	-0.51%	-0.74%	-0.18%	-0.20%	-0.28%	-0.40%	-1.16%
	PROPR	0.03%	0.00%	-0.03%	0.00%	67.61%	0.00%	-1.13%	0.00%	-29.98%	0.00%	-7.36%	-0.47%	-0.70%	0.00%	-0.39%	-0.27%	NA	-0.28%
	CAP	0.00%	0.00%	0.00%	0.00%	67.61%	-0.13%	-1.12%	0.04%	-29.95%	-0.87%	-7.28%	-0.51%	-0.73%	-0.13%	-0.20%	-0.26%	-0.41%	1.71%
Price_4	EMPLOY	0.00%	-0.02%	-0.21%	0.00%	66.02%	-0.26%	-1.16%	-0.07%	-0.97%	-1.11%	-9.75%	-0.15%	0.30%	-0.08%	0.18%	0.61%	0.14%	1.02%
	LAB	0.00%	0.00%	-0.21%	0.00%	66.01%	-0.20%	-1.16%	-0.07%	-0.97%	-1.03%	-9.75%	-0.15%	0.29%	-0.09%	0.17%	0.61%	0.14%	1.51%
	PROPR	0.00%	0.00%	-0.22%	0.00%	65.99%	-0.38%	-1.13%	0.00%	-1.01%	0.00%	-9.82%	-0.19%	0.26%	0.00%	0.00%	0.61%	NA	0.65%
	CAP	0.00%	0.00%	-0.21%	0.00%	66.02%	-0.26%	-1.12%	-0.07%	-0.96%	-1.30%	-9.76%	-0.14%	0.32%	-0.13%	0.18%	0.59%	0.10%	2.72%
Price_5	EMPLOY	0.03%	0.00%	-0.02%	-0.01%	108.33%	-0.14%	-1.31%	0.07%	-42.10%	-0.96%	-8.39%	-0.69%	-0.88%	-0.16%	-0.20%	-0.16%	-0.50%	-0.55%
	LAB	0.04%	0.00%	0.00%	0.00%	108.34%	-0.20%	-1.31%	0.07%	-42.09%	-1.03%	-8.38%	-0.69%	-0.87%	-0.15%	-0.20%	-0.17%	-0.50%	-1.08%
	PROPR	0.04%	0.00%	-0.03%	0.00%	108.50%	0.00%	-1.29%	0.00%	-42.04%	0.00%	-8.59%	-0.66%	-0.88%	0.00%	-0.39%	-0.17%	NA	-0.16%
	CAP	0.00%	0.00%	0.00%	0.00%	108.30%	-0.13%	-1.40%	0.07%	-42.12%	-0.87%	-8.35%	-0.69%	-0.86%	-0.13%	-0.20%	-0.20%	-0.51%	3.14%
Price_6	EMPLOY	0.01%	-0.02%	-0.19%	-0.00%	104.51%	-0.26%	-1.39%	-0.05%	-16.04%	-1.24%	-10.79%	-0.36%	0.04%	-0.10%	0.13%	0.61%	-0.01%	0.92%
	LAB	0.00%	0.00%	-0.21%	0.00%	104.50%	-0.20%	-1.39%	-0.05%	-16.03%	-1.29%	-10.79%	-0.37%	0.04%	-0.09%	0.13%	0.60%	-0.01%	1.24%
	PROPR	0.01%	0.00%	-0.19%	0.00%	104.45%	-0.38%	-1.37%	0.00%	-16.08%	0.00%	-11.04%	-0.38%	0.00%	0.00%	0.00%	0.61%	NA	0.64%
	CAP	0.00%	0.00%	-0.21%	0.00%	104.53%	-0.26%	-1.40%	-0.04%	-16.02%	-1.30%	-10.75%	-0.36%	0.05%	-0.13%	0.13%	0.59%	0.00%	3.92%
Price_7	EMPLOY	0.03%	0.02%	0.15%	-0.02%	32.89%	-0.01%	-0.82%	0.15%	-42.51%	-0.39%	-3.63%	-0.64%	-1.46%	-0.22%	-0.50%	-1.11%	-0.77%	-2.13%
	LAB	0.04%	0.00%	0.10%	0.00%	32.88%	0.00%	-0.81%	0.15%	-42.51%	-0.26%	-3.63%	-0.64%	-1.45%	-0.21%	-0.51%	-1.10%	-0.77%	-3.36%
	PROPR	0.03%	0.00%	0.16%	0.00%	32.79%	0.00%	-0.80%	0.00%	-42.55%	0.00%	-3.68%	-0.66%	-1.49%	0.00%	-0.39%	-1.11%	NA	-1.14%
	CAP	0.00%	0.00%	0.14%	0.00%	32.86%	0.00%	-0.84%	0.15%	-42.47%	-0.43%	-3.64%	-0.63%	-1.45%	-0.26%	-0.50%	-1.12%	-0.81%	-0.33%
Price_8	EMPLOY	0.04%	0.02%	0.14%	-0.02%	70.84%	-0.02%	-1.01%	0.16%	-52.94%	-0.54%	-4.81%	-0.80%	-1.55%	-0.22%	-0.49%	-0.95%	-0.84%	-1.95%
	LAB	0.04%	0.00%	0.10%	0.00%	70.85%	0.00%	-1.00%	0.15%	-52.94%	-0.52%	-4.80%	-0.81%	-1.55%	-0.21%	-0.47%	-0.95%	-0.84%	-3.20%
	PROPR	0.04%	0.00%	0.16%	0.00%	70.85%	0.00%	-0.97%	0.00%	-52.93%	0.00%	-4.91%	-0.76%	-1.58%	0.00%	-0.39%	-0.96%	NA	-0.99%
	CAP	0.00%	0.00%	0.14%	0.00%	70.85%	0.00%	-1.12%	0.15%	-52.98%	-0.43%	-4.80%	-0.80%	-1.55%	-0.26%	-0.49%	-0.98%	-0.81%	1.03%
Price_9	EMPLOY	0.05%	0.02%	0.13%	-0.02%	113.48%	-0.03%	-1.20%	0.16%	-62.69%	-0.70%	-6.08%	-0.96%	-1.60%	-0.20%	-0.45%	-0.75%	-0.89%	-1.64%
	LAB	0.04%	0.00%	0.10%	0.00%	113.50%	0.00%	-1.20%	0.17%	-62.69%	-0.78%	-6.08%	-0.96%	-1.60%	-0.21%	-0.44%	-0.75%	-0.89%	-2.83%
	PROPR	0.05%	0.00%	0.13%	0.00%	113.36%	0.00%	-1.21%	0.00%	-62.65%	0.00%	-6.13%	-0.95%	-1.58%	0.00%	-0.39%	-0.75%	NA	-0.77%
	CAP	0.00%	0.00%	0.14%	0.00%	113.49%	-0.04%	-1.12%	0.15%	-62.70%	-0.87%	-6.04%	-0.96%	-1.59%	-0.26%	-0.44%	-0.72%	-0.92%	2.64%

Figure 1. Flow Chart of General CGE Modeling Procedures.

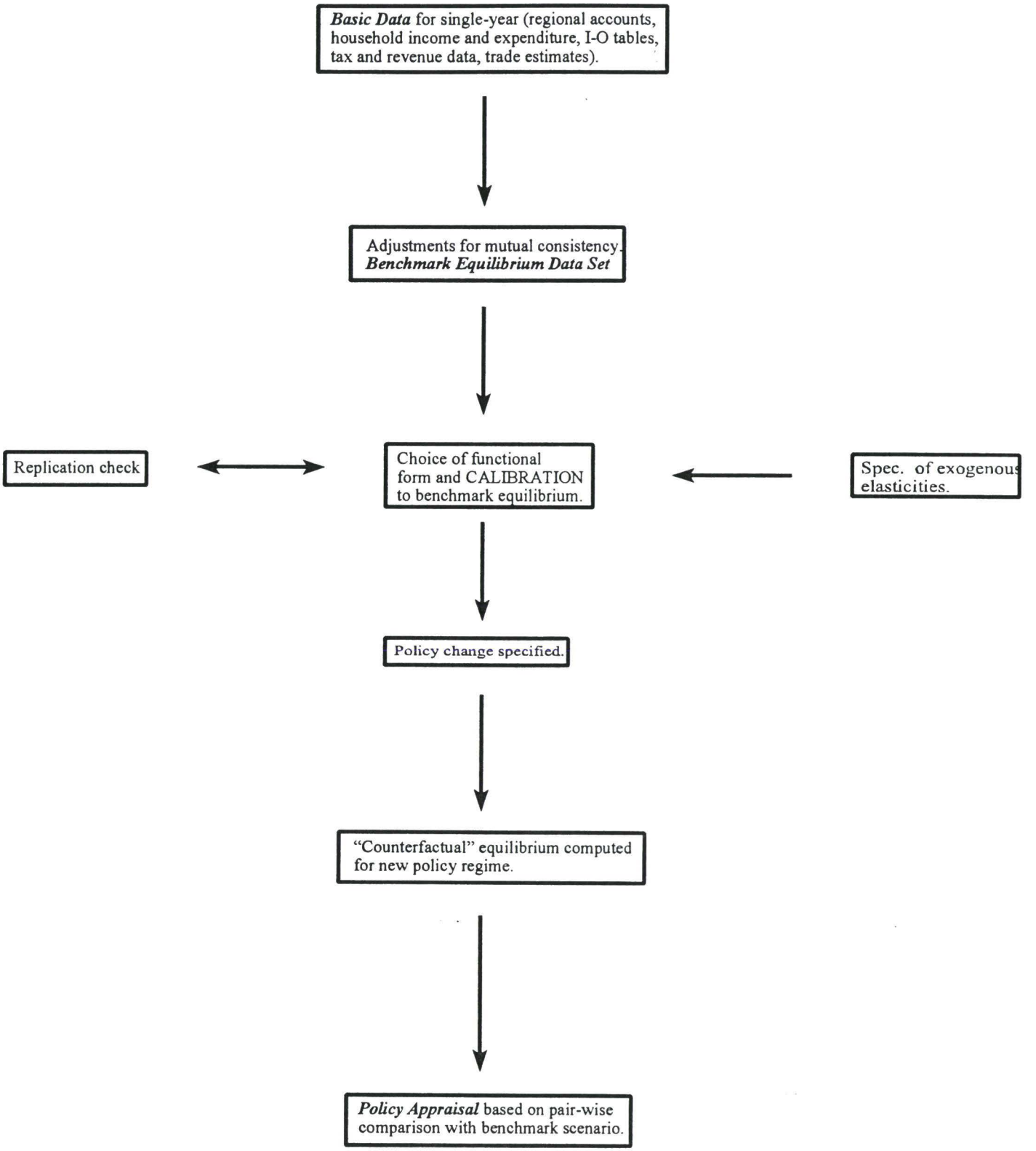
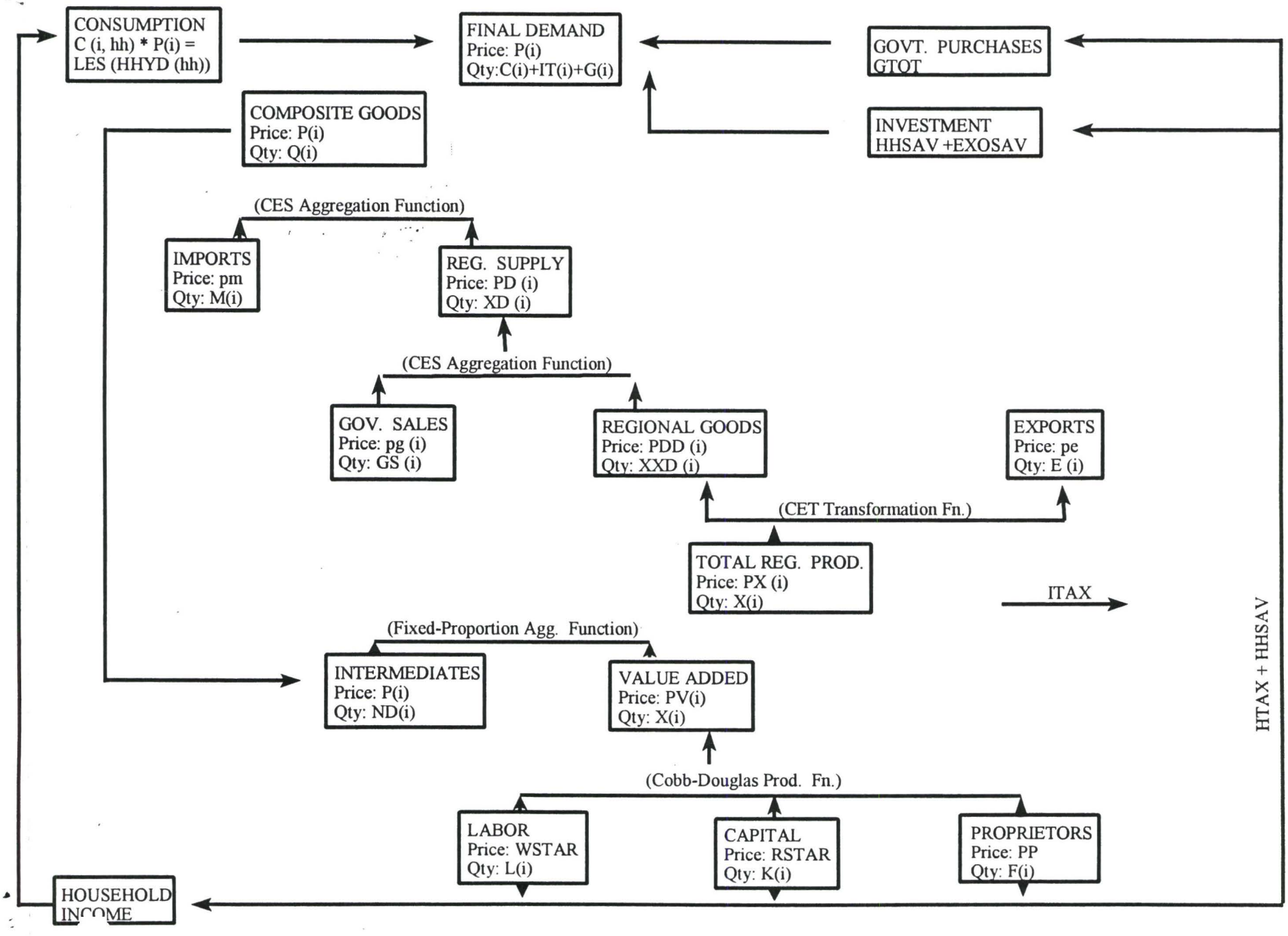

Basic Data for single-year (regional accounts, household income and expenditure, I-O tables, tax and revenue data, trade estimates).
Adjustments for mutual consistency. *Benchmark Equilibrium Data Set*
Replication check
Choice of functional form and CALIBRATION to benchmark equilibrium.
Spec. of exogenous elasticities.
Policy change specified.
"Counterfactual" equilibrium computed for new policy regime.
Policy Appraisal based on pair-wise comparison with benchmark scenario.

Figure 2. Schematic of the Northeast Oregon CGE Model.



Appendix A. Northeast Oregon Model Sector's Scheme

Sector Name	Sector Description
Lvstock	Range and Ranch Fed Livestock
Feedlot	Cattle Feedlots
Crops	All Crops except Hay and Pasture
Feed	Hay and Pasture
Logging	Forestry Products and Logging
Oanr	Other Ag. and Natural Resources including Mining
Constr	All Construction
Food	All Food Processing
Wood	All Wood Processing
Hitech	Electronic and Instrument Manufacturing
Oman	All Other Manufacturing
Tcu	Transportation, Communication, and Public Utilities
Trade	Wholesale and Retail Trade
Edl	Engineers, Doctors, and Lawyers
Fire	Finance, Insurance, and Real Estate
Oservs	All Other Services
Govt	Government Industry and Government Enterprises